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SCIENCE & TECHNOLOGY  
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DEVELOPMENT, PRODUCTION OF ROBOTS IN CEMA COUNTRIES OUTLINED

Warsaw PRZEGLAD TECHNICZNY in Polish No 28, 8 Jul 84 pp 38-39

[Article by Michail Pullman, consultant at the Department of Scientific and Technical Cooperation of the CEMA Secretariat: "Industrial Robots in the CEMA Countries"]

[Text] The communique of the 37th CEMA session, which was held in 1983, focused attention on tasks to realize basic decisions that are designed to accelerate technological progress. Above all, these decisions concern material-savings, radio-electronics, chemical products and industrial robot technologies.

Automation: The Most Important Task

Worthy of emphasis is the fact that automation in industry is now treated as one of the most important tasks in most CEMA countries. These countries are attempting to increase the tempo of realizing this task.

Cooperation in the realm of automation has taken many paths for many years. Bilateral contacts among CEMA countries were strengthened in the mid-1970's in the form of agreements among appropriate scientific-research and production organizations that became acquainted with one another via automation programs and that coordinated their activities, especially in the area of scientific and technical work.

The following figures confirm the tempo of automation in the CEMA countries: 250 industrial robots were operating in the USSR in 1975, but in 1980 there were 6,600; at the same time, about 230 robots were in operation in Bulgaria and 300 or less in Poland, the GDR and Czechoslovakia. In the opinion of Soviet specialists, in the not-too-distant future the number of industrial robots in the CEMA countries will expand significantly. In 1985, the USSR will have 40,000 robots, the GDR 8,000, Czechoslovakia 1,100, and Bulgaria 2,300. By the end of this decade 200,000 industrial robots will be in operation in the CEMA countries. This will permit specialization and cooperation in the production of industrial automatons in accordance with the determination of the CEMA session.

At the present stage of automation, robots will be used mainly in technologies that are served by the engineering industry, that is, for cold pressing, mechanical working, welding and pressure welding.

Later applications of robots will include painting, galvanizing, transportation and casting.

#### Cooperation

Soviet and Bulgarian specialists cooperated to build a new pressure welding robot. The automaton that was produced as a result of this cooperation is now being tested in the USSR and Bulgaria. After testing is completed, the robot will be used extensively by the tractor, agricultural machinery and transportation equipment industries. The cooperation of the Soviet Scientific Institute in Voronets and the Czechoslovak Scientific-Production Association in Presov in building experimental models of a multifunctional modular industrial robot, and in designing and implementing industrial robots, including the UM 160 (see PRZEGLAD TECHNICZNY No 18, 1984) also produced excellent results. Later, the CEMA countries advanced to a new stage of cooperation in the realm of building and applying industrial robots. The new stage is characterized by an expansion of multilateral contacts. A new agreement was signed in 1980 on multilateral scientific and technical cooperation in building modern industrial robots for various branches of the economy. On the basis of this agreement, simultaneous activities are being conducted to design and rapidly bring to production industrial robots. This work, the aim of which is to create automated, integrated technological systems, will permit about 150 different types of industrial robots to be included among the basic production equipment.

The agreement on multilateral specialization and cooperation enabled the production of 58 types of industrial robots to be divided among the CEMA countries. About 75 percent of the robot types designated in the agreement will be produced in one or two countries, which will satisfy the needs of the other CEMA members. About 1,500 units will be delivered in the 1981-1985 period. It is projected that these automatons will be exported from Bulgaria, Czechoslovakia and Poland to the USSR. The expansion of cooperation and the increased demand of the CEMA countries for industrial robots require a more comprehensive resolution of the uniformization and standardization processes, the adoption of a uniform concept for developing automation and the more extensive and effective coordination of activities in this area.

To this end, at the 36th CEMA session the CEMA countries signed general agreements on multilateral cooperation in developing and applying micro-processor technology more extensively in the national economies of the CEMA countries, on multilateral cooperation in developing and organizing specialized and cooperative production of industrial robots, and on specializing and cooperating in the production of microelectronic components for computer technology. The primary assumptions of the agreements, based on the international division of labor, is the assurance that the needs of the CEMA countries will be satisfied for industrial robots, their standardized

modules, assemblies and parts, and for ancillary and adapting equipment that will permit assembly lines to be automated.

Special attention is being paid to designing modular robots. This will permit the building of automats for all kinds of production without the need to start everything from the beginning when a robot is applied to a new technological process.

#### The Future

The general agreement is being realized. The first important stage of cooperation has been completed; it was executed within the framework of the Committee on Scientific and Technical Cooperation, the 12 permanent CEMA commissions and the Interelektro organization. Technical requirements were defined, and the need for the variously designated industrial robots was established. Based on the achieved results, the committee developed comprehensive technical requirements concerning industrial robots and their standardized subassemblies and parts. The committee also analyzed the designs of robots functioning in the various industrial branches of the CEMA countries and in worldwide robot construction practices.

Within the framework of the permanent commission on cooperation in the engineering industry, a meeting of representatives of appropriate organizations was held at which--on the basis of materials prepared by the Commission on Scientific and Technical Cooperation--proposals were prepared concerning supplements to the agreements on multilateral scientific and technical cooperation, on industrial robots and on control systems. The Institute for CEMA Standardization drafted "A Program for Comprehensive Standardization of Automated Industrial Machines for the 1983-1990 Period."

Conducting scientific research and design work to build modern automatic machines that are characterized by a high degree of standardization for basic subassemblies and parts is the next step in realizing the general agreement. This work will be accelerated by increasing the tempo of realizing the program for comprehensive standardization that was passed at the 90th meeting of the Permanent Commission on the Engineering Industry.

Scientific and technical progress impose new and increasingly more difficult tasks in the area of automation of industry. Automats that are much easier to adapt to the production line, and robots that are capable of executing individual programs and are self-repairing are needed today. Scientists project that second generation robots that are equipped with many sensors, including visual sensors, will appear next year. By the end of this decade, the basic types of robots will be equipped with microprocessor devices that will enable them to analyze a situation and make decisions that are necessary to execute production tasks on command. There is talk about robots that will be able to assemble new robots. Man has dreamt a long time about mechanical helpers that could be entrusted to do difficult work. These dreams are being realized in our time. Industrial robots free man from doing unhealthy and monotonous work and heavy physical labor; they improve the efficiency, variety and overall culture of production. The group effort

will help the individual CEMA countries and the entire socialist community to achieve positive results more rapidly by executing this very important and complicated task. At the same time, it will make them more economically and technically independent of the capitalist countries of the West.

11899

CSO: 2602/37

## BULGARIAN COMPUTER INDUSTRY VIEWED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 2, 3

[Text]

Computer industry made its appearance in Bulgaria in 1959, when the first experiments in that field began. The first Bulgarian computer, made of tubes and a drum operative memory, was devised in 1962. It was followed by computers of the ES 1020 type. In 1963-64 articles were devolved which may be said to set the foundation of Bulgarian computer industry.

Of particular significance to the development of Bulgarian electronics is the agreement on the Establishment of an Intergovernmental Commission on Collaboration in the Development and Application of Computer Technology, signed in 1969 on a multilateral basis within the framework of the Council for Mutual Economic Assistance (CMEA). The pooling of experience, know-how and production capacities made it possible, within a relatively short time, to cope with this complex scientific and technical problem.

Bulgaria was a participant in the development of the **central ES 1020 processor**, which marked the beginning of a fruitful collaboration. It was introduced into production and became one of the mass ES machines.

The appearance of the **EIM ES 1035 computer** characterized by great reliability and high speed, a detailed system of diagnosis, enhanced accuracy of calculations and virtual organization of memory, may be considered as a new and signifi-

cant achievement in the development and production of big computers. Designed for grappling with a wide range of scientific-technical, economic, informational-logical and other problems, it is one of the basic models of medium-class computers elaborated at the second stage of the development of the unified system (ES).

Within the framework of CMEA, Bulgaria is now a leading country in the field of specialized processors for matrix data-processing and associative processors for ES computers.

In the field of minicomputers, machines with greater efficiency and a wide set of **peripherals** have been devised, which can find employment in different problem-oriented complexes for the control of production, recording and processing of a large volume of information, automation of designing.

The miniaturization of computers has made it possible to introduce into production computers for individual use on a large scale, with which at present radical changes in the character of the application of microcomputers are associated.

**Microprocessor systems** began to be developed in Bulgaria in 1976; two years later a number of systems were put into regular production which find employment in the field of bookkeeping, text-processing, automation of business activities, check-up of working time and

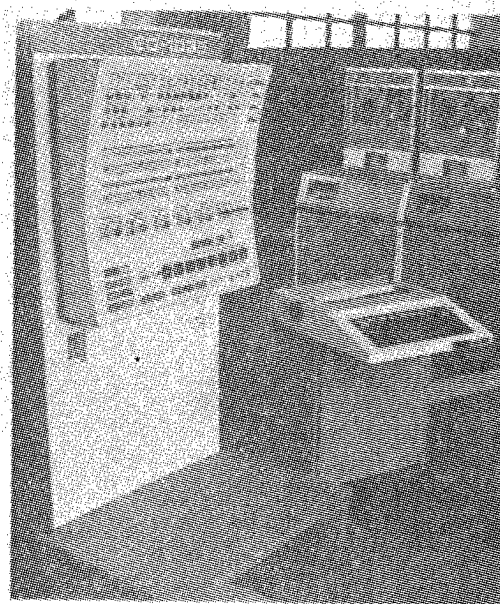


recording liquid fuel consumption in filling stations. The good operational possibilities of these systems ensure their wide application in the automation of a wide range of activities in various branches of the economy, public health and education.

Particular attention was paid to the operative servicing and utilization of computer technology resources with an optimal number of applications.

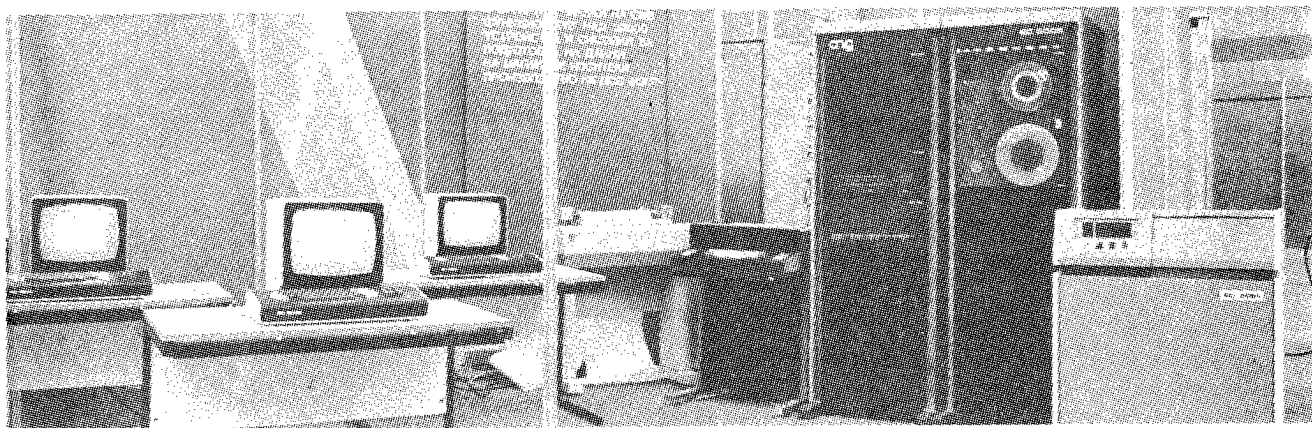
The serial production of the first **teleprocessing system, ESTEL**, so far the only one of its kind in the socialist states, was launched in Bulgaria in 1976. In developing this new technique, the necessity was taken into consideration of ensuring users in the socialist states access to computers from geographically distant sites. Going over to the new system of teleprocessing, ESTEL 4, whose aim it is to establish a complete system for a wide range of users, was the next step. The ESTEL system comprises a broad set of apparatus and program means; among which the ES 8371 communication processor, terminal modems, multiplexes and linear apparatus deserve particular mention. It can function with as many as 352 semiduplex lines, attaining an information exchange speed of 2,400 bits/sec.

In recent years Bulgaria has come to the fore as one of the world's foremost producers of **external memories**. The serial production of ES 5052 memory computers with magnetic disks and a capacity of 7.25 Mbytes commenced in 1971. Since



then several versions of this device have been developed, including ES 5061 with a capacity of 20 Mbytes, SM 5400 minimemory computer with magnetic disks with a capacity of 6 Mbytes, SM 5410 with a capacity of 12 Mbytes, and memory computer ES 5074 with flexible carrier.

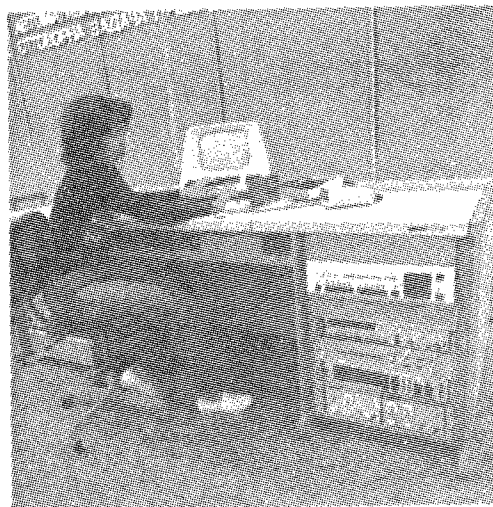
The appearance in 1978-79 of ES 5067.02 with a capacity of 2 x 100 Mbytes and of ES 5067 with a capacity of 200 Mbytes represented a qualitative leap in the development of this type of memory computers, where surface technology was



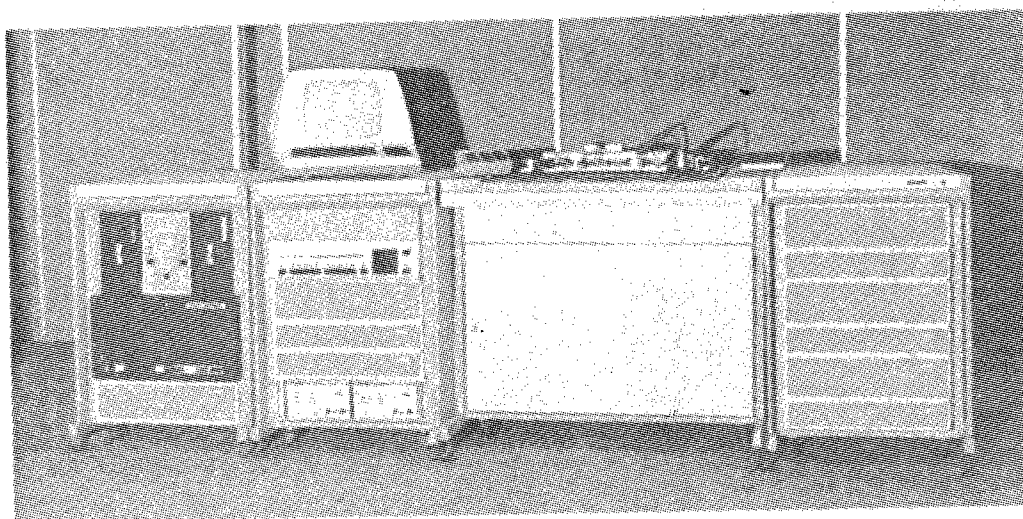
introduced as well. The utilization of these large devices will not be confined to the ES computer system. There are quite a few small machines which require a high-capacity external memory.

Designing and production in the sphere of high-speed memory computers with magnetic tape is proceeding along two lines: large high-speed units for large computers and mini slow-speed ones for minicomputers. The former come in two designs, the first with a vertical movement of the tape and automatic loading, in tune with the most up-to-date trends in the development of these devices. Both configurations have a monoreel start-stopper tape-moving mechanism. The first design is used in ES 5012 memory computers and its modifications and the second in ES 5003 memory computers and its modifications. The small computers are characterized by a low tape speed and a more compact design. They come in four dimensions:

ISOT 5003, SM 5300, SM 5302 and SM 5303 with different tape speeds. The trend in the large devices is toward greater record density up to 256 bits/mm by means of the 'group-coding' recording method and in the mini devices likewise toward increased record density up to 63 bits/mm by means of the 'phase-coding' recording method.



Bulgaria's specialisation in the field of memory devices of replaceable magnetic carriers provides a solid basis for coping rapidly with various problems connected with the designing and production of mechanisms for the preparation of data on magnetic carriers. The ES 9004 and ES 9003 devices and systems for the preparation of data on a magnetic tape have been created on the basis of mini memory computers with magnetic tape in combination with a keyboard. The first three devices of the set of means for data preparation on a flexible magnetic disk have also been



elaborated; these are SM 6901, ES 9112.01 and ES 9113 for the rerecording from flexible magnetic disk into magnetic tape.

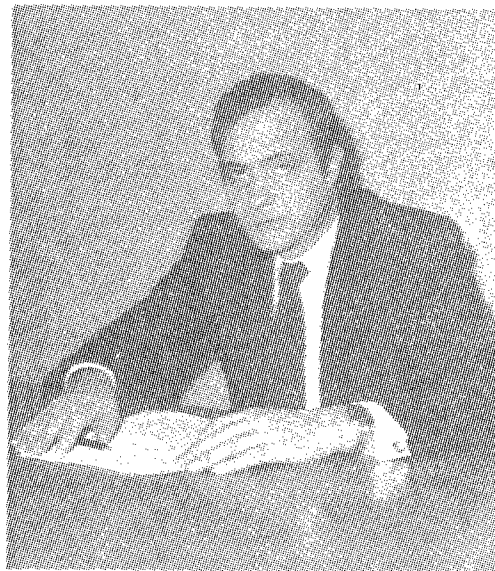
Simultaneously with the creation of new generations of processors, control devices and peripherals, **problem-oriented complexes (POC)** have been elaborated; these are intended for the automation of control and production, as well as for servicing the population in different sectors of the economy. Actually this is a most efficient pooling of computers, taking into account the user's requirements and shortening the development-application cycle.

A **multi-machine network** has likewise been created. Representing a complex of technical program means of the ES and SM computer series, it is designed for the entry, storage, transmission and processing of all kind of information connected with the control and proper functioning of all sectors of the economy and offers a

qualitatively new technology for data-processing. Its aim was to merge the existing **territorial computer centres** into a multi-machine network which is to grapple with a wide range of scientific, technical, economic, informational, logical and other problems.

The processing of information in the administration is to be automated by the development of **an integrated administrative system (IAS)**. The processing of documents will be automated in the subsystem. The development of the basic IAS and the IAS family should permit to extend the production list and to multiply computer products in the new spheres of application. Conditions are being created for improving the quality indicators of administrative and managerial work.

The achievements of Bulgarian electronics and computer technology tend to streamline the nation's economy and make it possible to meet more fully the needs of our foreign trade partners.



Eng. Ivan Tenev  
Deputy Minister of Machinebuilding and Electronics  
Director General of ISOT Corp.

CSO: 2202/18

ISOTIMPEX TRADES WITH OVER 30 COUNTRIES

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 4, 5

[Interview with Lyubomir Vitanov, Director General of the Isotimpex Foreign Trade Organization; date and place not specified]

[Text]

**Question:** Which are the principal export products of Isotimpex?

**Answer:** For over 15 years Bulgarian electronic products bearing the Isotimpex trademark have been marketed abroad.

The export list, which is continuously being updated, is meeting ever more fully the demand of our traditional customers. It includes medium-size computers of the ES system, mini-computers of the SM system, as well as new types of disk subsystems with a varying volume of memories, tape subsystems, videoterminals, modems, floppy disk devices, cash registers and calculators with printers, and new magnetic data-carriers such as disk packets of enhanced capacity, mini-disk packets with a capacity above 20 NB, diskettes, gauges, control instruments and apparatus, electronic components and constructive elements.

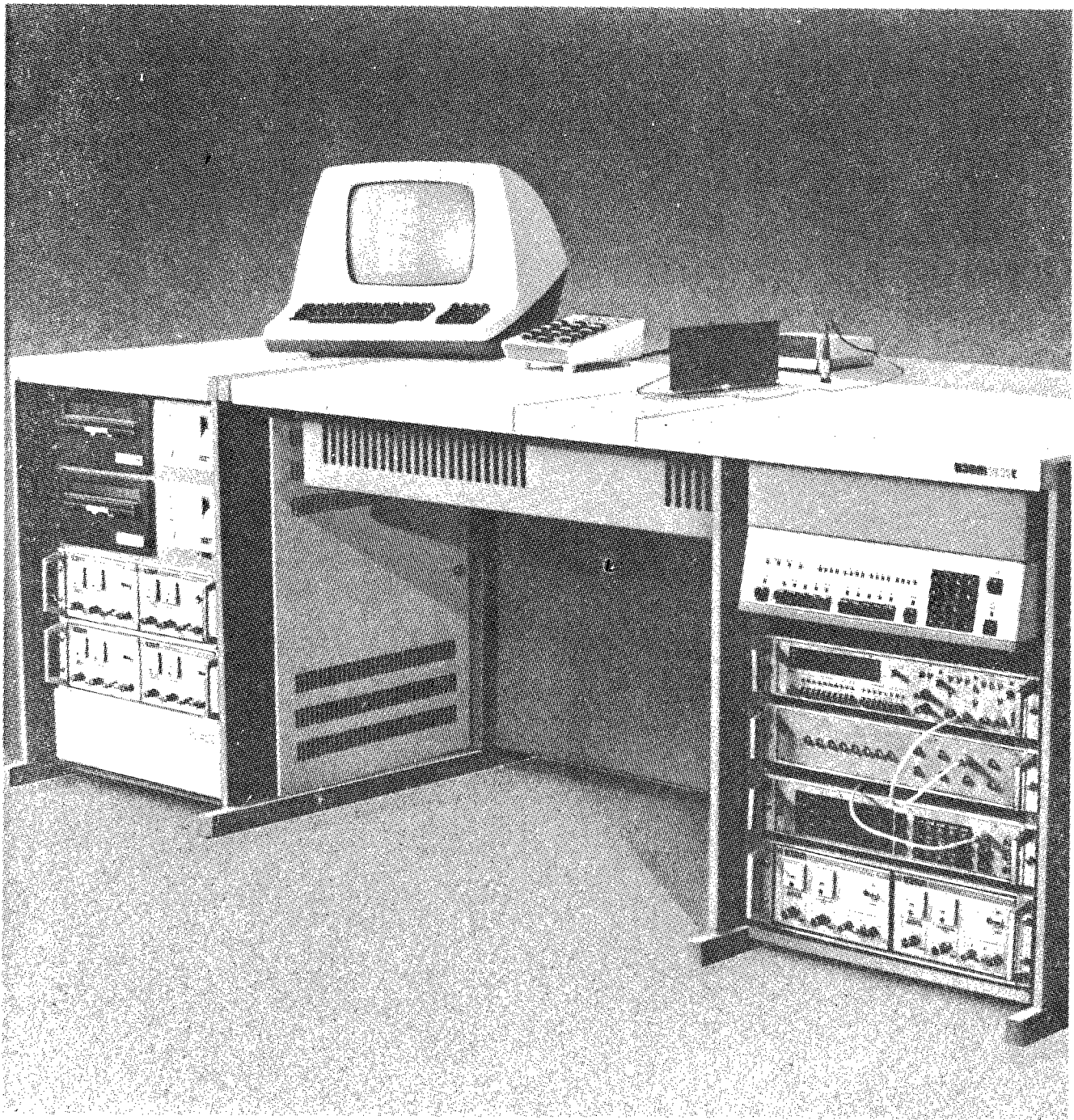
Several versions of problem-oriented complexes (POC), made on the basis of big and small microprocessor systems, are also exported. They find employment in the control of production and control processes in agriculture, control of warehouse centres, commercial services, registration of working time and data preparation. Bulgarian computers and the wealth and variety of peripheral equipment have demonstrated their good quali-

ty and Isotimpex has shown in practice that it is a prompt and reliable supplier of equipment, including service and spares, as well as personnel training.

**Question:** Could you list a few countries with which you've concluded major business deals?

**Answer:** Isotimpex maintains business contacts with more than 30 countries in Europe, Asia, Africa, Central and South America. Of paramount importance to us are the specialization and cooperation with the CMEA member-states, first and foremost with the USSR, which is our No.1 partner in the import of machinery and equipment for plants of the electronic industry, as well as in the import of products of the three state organizations, Isot, Electromaterials & Constructive Elements, and Automation & Instrument-making. As a result of the continuous intensification and expansion of Bulgaro-Soviet trade, bilateral agreements have been signed in the field of computer technology, instrument-making, constructive elements and components. These agreements, realized in contracts, secure the export of the bulk of Bulgarian electronic products.

Isotimpex is an appreciated business partner of a number of renowned firms from Federal Germany, France, Italy, Great Britain, Canada, USA and Japan.



ISOT 1011 C Automatic system for testing digit-analog printed plates

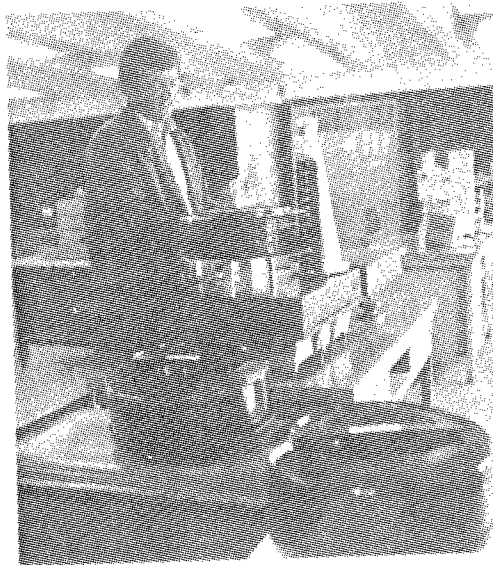


The chief products exported to these countries are apparatus and means of automation, business machines, constructive elements and components, peripherals for computers, diskettes and software. The main forms of collaboration with the non-socialist states are, besides joint ventures in industry, direct sales and purchases, compensation deals, and purchases of licenses.

Isotimpex' business contacts with the developing countries are also extending. The export of electronic equipment to these countries is doubling every five years. We are exporting typewriters, apparatus and means of automation, energy meters, selenium rectifiers, capacitors and software services to more than 20 countries in Asia, Africa and Latin America. In India a Bulgarian computer centre equipped exclusively with Isotimpex disk packets and peripherals has been functioning for a good many years. Well-known firms from Egypt, Pakistan, Peru, Ecuador, Brazil and Argentina figure among the partners of Isotimpex.

**Question:** Along what lines is your future activity directed?

**Answer:** Our trade policy is in complete consonance with world trends of development of computer technology and business machines. Through specialized directorates and in collaboration with production corporations which we service, we shall direct our future activity toward meeting more fully the demand of our traditional customers for Bulgarian electronic products, and toward developing new forms so as to increase the supply of Isotimpex machines, systems and products.



Inside view of the plant for disc packs in Pazardjik.



Lyubomir Vitanov  
Director General of the Isotimpex  
Foreign Trade Organization

## CEMA COLLABORATION IN ELECTRONICS, ENGINEERING

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 6, 7

[Article by Eng. R. Marinchev: "Collaboration with the CMEA Countries in Electronics and Electrical Engineering"]

[Text]

The rapid progress of Bulgarian electronics and electrical engineering is due largely to socialist economic integration. In 1981-85 the Ministry of Machinebuilding and Electronics and its economic organizations concluded over 90 agreements, contracts and protocols on specialization and cooperation in production, about two thirds on a bilateral and one third on a multilateral basis.

Specialization in electronics and electrical engineering encompasses over 120 articles or groups thereof. The percentage of specialized products in the nation's exports is increasing from year to year, and in 1982 it attained over half (52 p.c.) of the total volume of export of engineering products.

The policy of scientific and technological cooperation on a bilateral and multilateral basis, pursued by the Ministry of Machinebuilding and Electronics, follows well-established forms: joint developments, exchange of experience consultations, specialization, lending technical assistance and handing over of technical documentation. Here are a few concrete examples:

The ES 2635 central processor was devised by a Soviet-Bulgarian team. At present joint developments with the USSR are proceeding in the field of computer technology: subsystems for external memories with a big capacity as well as the 1036 and 1037 computers.

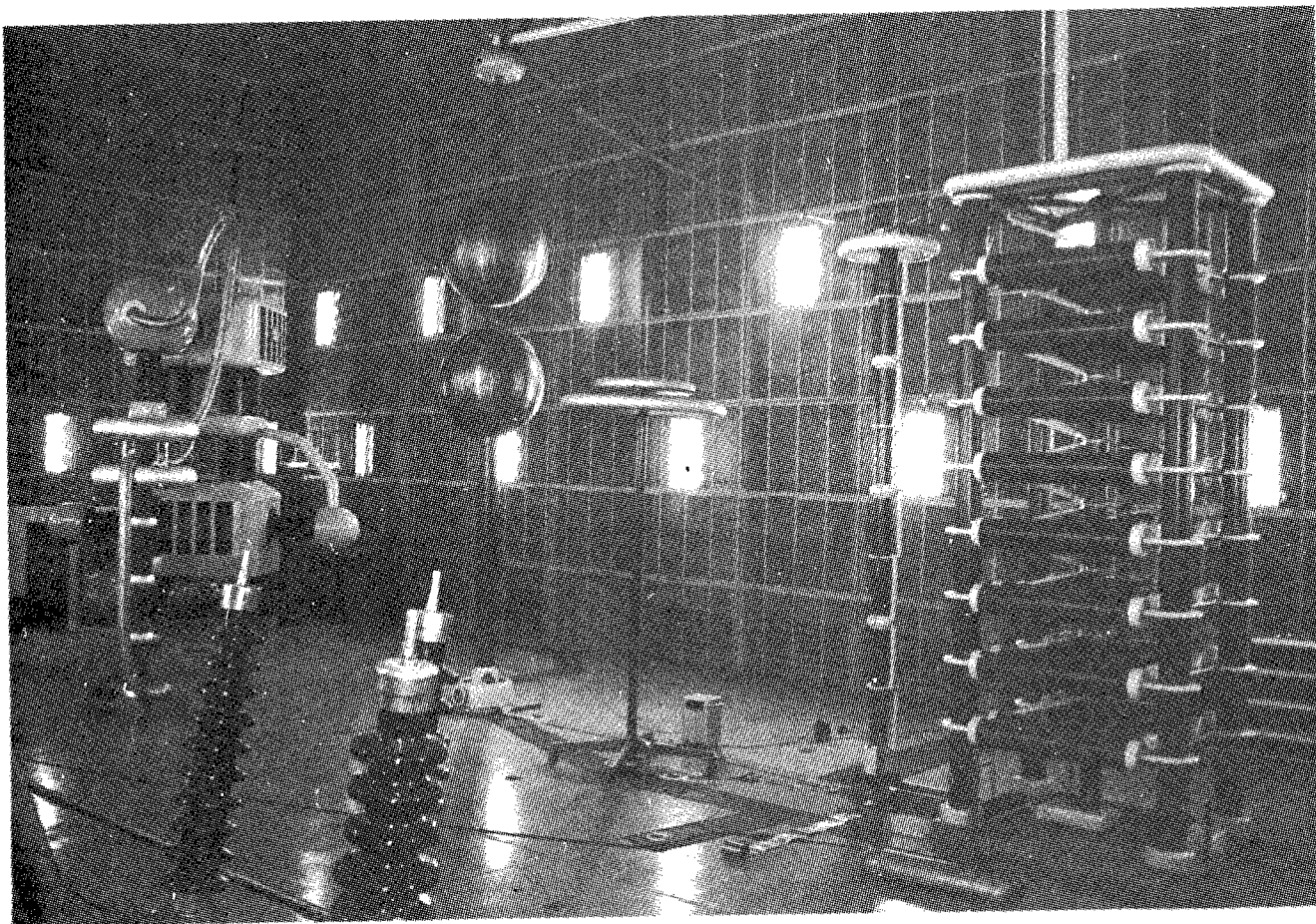
In the sphere of power engineering the international organization Interelectro is devising a new series of induction motors after a unified technical documentation. Modern versions of small electric motors are being designed and put into operation through the newly-established Bulgaro-Soviet research and production corporation Electroinstrument. The design of complete distribution devices (CDD) for up to 20 kV and a rated current up to 2500 A, as well as other products, are being standardized jointly with the Soviet partners. The joint activities of the CMEA member-states in the field of radioelectronics have also been yielding good results. As a member of the CMEA Standing Committee on Radiotechnics and Electronics, Bulgaria is participating in the elaboration of 17 themes and is a coordinator in the development of telephone sets for promising telephone exchanges. The principal technical conditions and schematics for the elaboration of a 4th generation of colour TV sets have now been coordinated.

The joint efforts of Bulgarian and Soviet specialists in the Designing Office for Automation of Agricultural Machines has led to the development and introduction into production of USAC (Universal System for Automatic Control) electronic apparatus, KEDR (System for Automatic Control of Distributive Seeders) and

SACS (System for Automatic Control of Sowing). Another new development are the LEN ultrashortwave broadcasting stations for use in agriculture, railway transport and other branches of the economy. Particularly fruitful is the collaboration in the development and introduction into production of radionavigation apparatus.

The close integration ties in instrument-making have been greatly stimulating the export of these products, which now come up to 75% of its total volume. This collaboration stretches all the way from research via production to marketing. A case in point are the so-called functional mechanisms.

Proposals, coordinated with Soviet Ministries, related to the General Scheme for Specialization and Cooperation in Production up to 1990 in the field of electronics and electrical engineering, have been leading to an extension of the list and an intensification of collaboration. These proposals include systems for teleprocessing, peripherals and processors; products of communication technology: automatic telephone exchanges, multiplex and radiorelay apparatus; power engineering products: energy equipment, complex transformer stations, sets of distribution devices, large-scale synchronous motors, and electric drives for machine tools with programming; toolmaking products: gauges

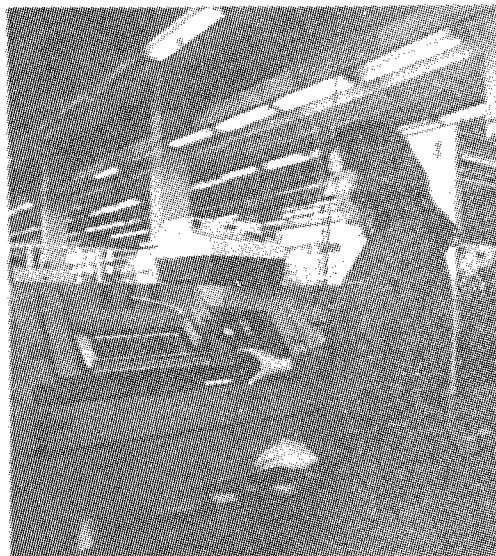
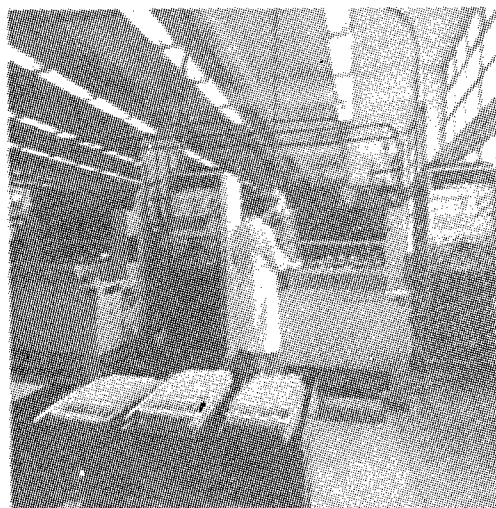


Elprom-Energo combine, hall for testing step-by-step regulators and transformers.



and electric drives for machine tools with numerical program control: products of instrument-making: measuring instruments, complete wiring for machine tools; electronic systems for stockbreeding, pneumatic control devices, as well as electronic elements and components.

The introduction of new jointly developed products as a result of bilateral and multilateral collaboration along CMEA lines opens up new avenues for export, while the modern technologies enhance the quality of the output, which leads to an expansion of mutual deliveries.



Machine hall for plate-testing in the plant for telephony and telegraphy in Sofia.



Colour IV set tuning in Virosilov research-production combine for telecommunication machinery.

CSO: 2202/18

# SOFIA'S COMPUTER EQUIPMENT PLANT VIEWED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 8

[Article by Eng. V. Minev, Deputy Director: "Products of the Computer Equipment Plant in Sofia"]

[Text] The activities of the plant computer equipment in Sofia comprise the final assemblage and attunement of devices of the unified system of computers (ES EIM and SM EIM) and the NPC systems for machine tools.

The bulk of the production list consists of all-purpose as well as specialized technical means: SP ES 2635, ES-2335, MD ES-5567, UM ES-5667, ES-5525.05, subsystems 29 MB, 100/200 MB, SM 5405 for SM-4 and systems ES-1035.03 and ES-1035.21 of ES EIM RIAD-2. These are traditional articles turned out by the plant and correspond to Bulgaria's specialization within CMEA (Council for Mutual Economic Assistance).

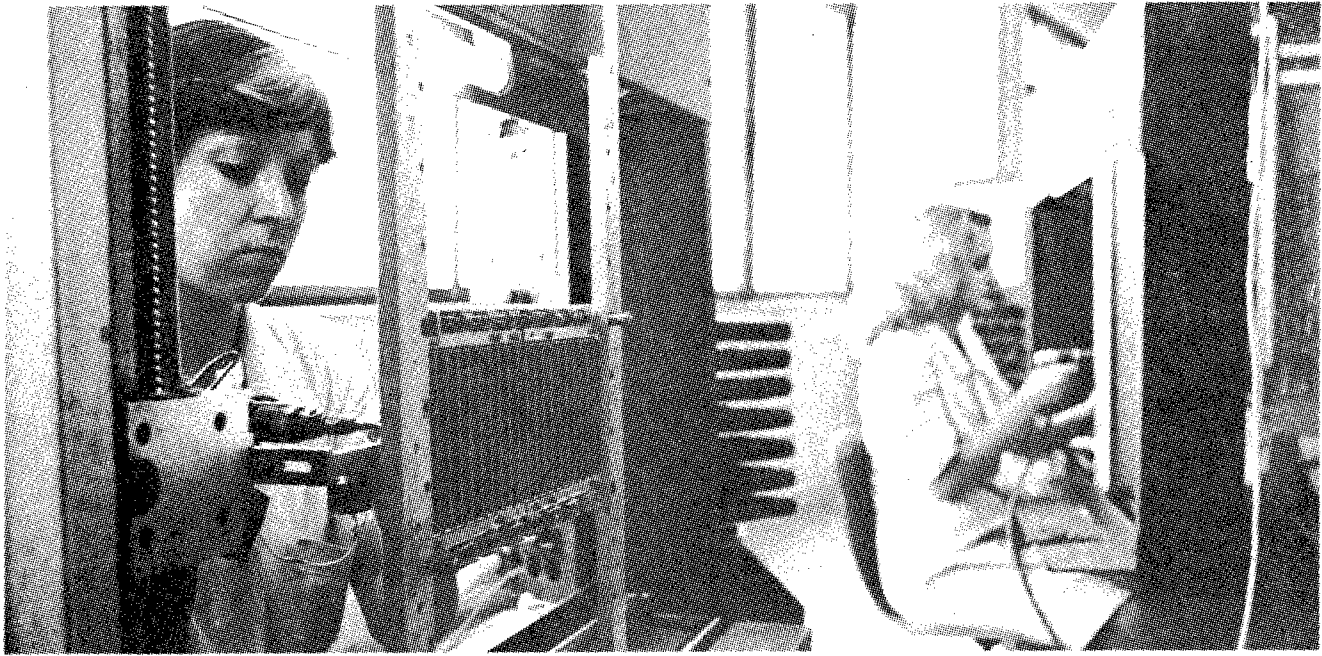
The ES-1035.03 and 21 computers comprise practically all the technical means and subsystems of the plant's production list. EIM ES-1035 is designed for coping with a wide range of scientific and technical, economic, informational-logical and other problems, both in autonomous conditions of work and in data-processing systems, including systems operating in a real time scale, in conditions of time-sharing, in dialogue systems and wherever an all-purpose machine nucleus of great computer capacity and a wide set of high-speed peripheral devices is required. The inclusion of a specialized ES-2335 processor for matrix calculations permits to create a problem-oriented complex demanding the processing of large data files. When the ES 8371 communication processor is added

to the system, an all-purpose computer complex for collective use and teleprocessing of data can be established.

ISOT 0501S/SAIT/ is a system for the automation of engineering work, a fruit of the experience gained in the sphere of designing, constructing and technology within the framework of the ISOT Corp. Systems based on minicomputers are to be turned out, so as to meet automation requirements of designing in the field of machinebuilding.

The ZIT-500 numeric program control for machine tools figures prominently in the plant's production program and corresponds to the automation requirements for machine tools. The refinement of the numeric program control systems produced so far is to continue by modernizing ZIT-500 systems, functions connected with automatic measurements and corrections are to be obtained and interface is to be introduced for linkage with a higher level. These systems will open up new opportunities, such as their inclusion in the establishment of flexible production lines and systems, as well as in comprehensive automatic projects. The plant for computer equipment will develop as a major system plant with a highly effective organization of control and production.

Specialized computers — problem-oriented complexes and applied complexes — are to figure ever more prominently in the production program.



CSO: 2202/18

## CNICA: COMPLEX AUTOMATION ENGINEERING

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 9

[Article: "CNICA--Engineering Organization for Complex Automation"]

[Text] The Research Institute of Comprehensive Automation (CNICA) was set up in 1961. In the odd two decades that have elapsed since then it has won a good reputation as a specialist in the automation of production, control and engineering.

In tune with progressive trends in world practice, the institute develops technical means, systems for local and comprehensive automation and problem-oriented complexes on the basis of computer technology or by means of conventional techniques. In the past few years, along with the refinement of research work and implementation, the range of services offered has been extended so as to facilitate a rapid and more effective mastering of the systems by users. The CNICA systems are designed for the automation of production and technological processes of newly-built projects both at home and abroad, as well as of projects undergoing reconstruction and modernization. The main thematic directions in the institute's research and development work are:

- a) automation of continuous and discrete technological processes in machinebuilding, chemistry, metallurgy, light industry, construction work, railway transport and agriculture;
- b) automation of organizational and economic control of plants;
- c) automation of engineering; and
- d) integrated systems.

CNICA has a highly competent staff of specialists with considerable experience, so that it is capable of coping with com-

plicated problems connected with the establishment of modern systems of automation. A pilot plant which turns out specific technical means on a small scale as accessories for automation systems is at its disposal.

The CNICA branch in Plovdiv, Bulgaria's second-ranking city, elaborates automated systems for the control of technological processes as well as operative-dispatcher control in the ceramic, furniture and glassware industries. Recently a second branch was opened in Varna.

CNICA is in a position to assist users at all stages of drafting of automation blueprints or in their overall realization. The implementation of comprehensive automation systems takes from 12 to 18 months on the average.

CNICA cooperates with quite a few kindred organizations abroad, among which the following deserve particular mention: ZNIIKA, IPU and the Institute of Cybernetics in the USSR, Robotron in the German Democratic Republic, Iskra in Yugoslavia, Morando Impianti in Italy, Polymont in France and the renowned Siemens in Federal Germany. The institute's products are exported to the Soviet Union, Egypt, Cuba and a number of other countries.

CNICA is always ready to discuss automation issues, to engage in joint ventures and to open technical agencies, in short to pursue any activity likely to speed up the introduction of peak achievements in the field of automation.



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## CNICA DEVELOPS APCS-SM

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 10

[Article: "May We Call to Your Attention Some of the Latest CNICA Developments APCS-SM"]

[Text]

The data base is the main subsystem; it ensures the work of the other subsystems. It is organized with SUBD-SETOR-SM and FOBRIN II. The operational system is DOS-RV-B, suitable for multi-program work and servicing of a large number of terminals in a dialog regime.

The control of production with APCS-SM comprises all levels of control activities in small and medium-sized engineering enterprises and speeds up data-processing, facilitates strict and rational fulfilment of the plan targets and makes for considerable saving of raw materials, labour and machinery.

In the process of work APCS-SM performs:

- a) data control during its entry into the system and its processing, as well as updating;
- b) collection and processing of data directly from the production process at the moment of its appearance and operational tracking of production orders;
- c) writing operational check-ups of the state of production in a dialog regime; and
- d) informational servicing of administrative, economic and technical offices.

The modular principle allows for easy adaptation to different engineering enterprises with relatively low capital investments. The programmable RBT 4000

videoterminals and data-concentrator used in workshops do not call for special qualification of the personnel, which facilitates the use of the system.

At request APCS-SM is supplied together with the ISOT 1001 S system for personnel attendance check-up with up to 64 terminals.

APCS-SM stands for automatic production control system in small and medium-sized engineering plants turning out products that structurally and technologically are not too complicated.

The system consists of an ISOT 1016 S(SM-4) mini-computer and a wide terminal network for a decentralized data collection with SM 1604 videoterminals and RVT 4000 programmable videoterminals with printers. The technical means ensure reliable functioning of the system and simplicity in operation.

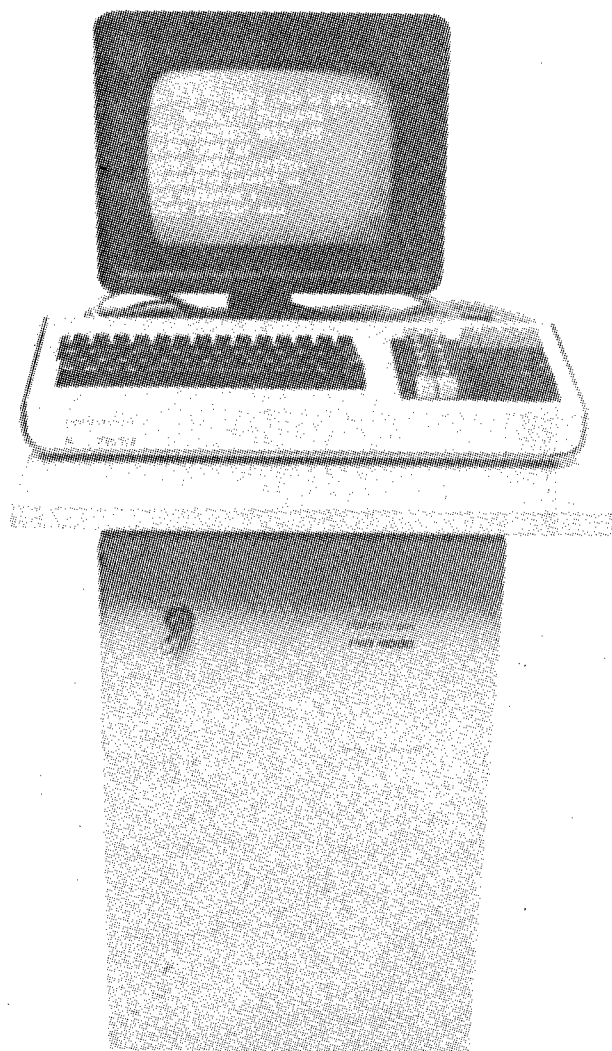
APCS-SM solves problems connected with the control of production in dialog and packed processing comprehensively; it is based on the modular principle and consists of the following subsystems:

- a) building, feeding and updating a data base
- b) technical preparation of production
- c) operative planning and control
- d) operative dispatching of production
- e) control of personnel and salaries
- f) control of marketing and sales activities
- g) control of fixed capital
- h) control of warehouse activities









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## CNICA DEVELOPS PROGRAMMABLE CONTROLLERS

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 11

[Article: "Procon Program-Technical Complex"]

[Text] Procon is one of the most recent CNICA developments. This complex includes a family of programmable controllers PROCON 64/128/192/256, a PROCON 1300 programmer, a PROCON 1310 pocket terminal, a standardized PROCON 1320 operator console and a corresponding software.

The complex serves to build up systems for the control of technological processes of a discrete and discrete-continuous character. The controllable objectives can be sets of machines, automatic technological modules, control and assembly automates, automatic flow lines, transport-feeding systems, warehouse transport systems, tool shops and manipulators. Designed primarily for machinebuilding, the complex can also find employment in the food industry, metallurgy, pharmaceutical and cement industry, car manufacture and electrical engineering.

The programmable controllers consist of a single structural and program base, which permit a flexible configuration of control systems, depending on the customer's desire and the specificity of the objective. They contain a processor block as well as input-output blocks. The latter has 64 discrete inputs and outputs, while the processor block has four positions for analog inputs and outputs. These controllers perform logical and arithmetic data-processing, time retainment and counting of events, create data files in the memory, recoding and exchange of information with a higher level of the control system, self-diagnosis in real time, storage of information when the power supply is

disconnected.

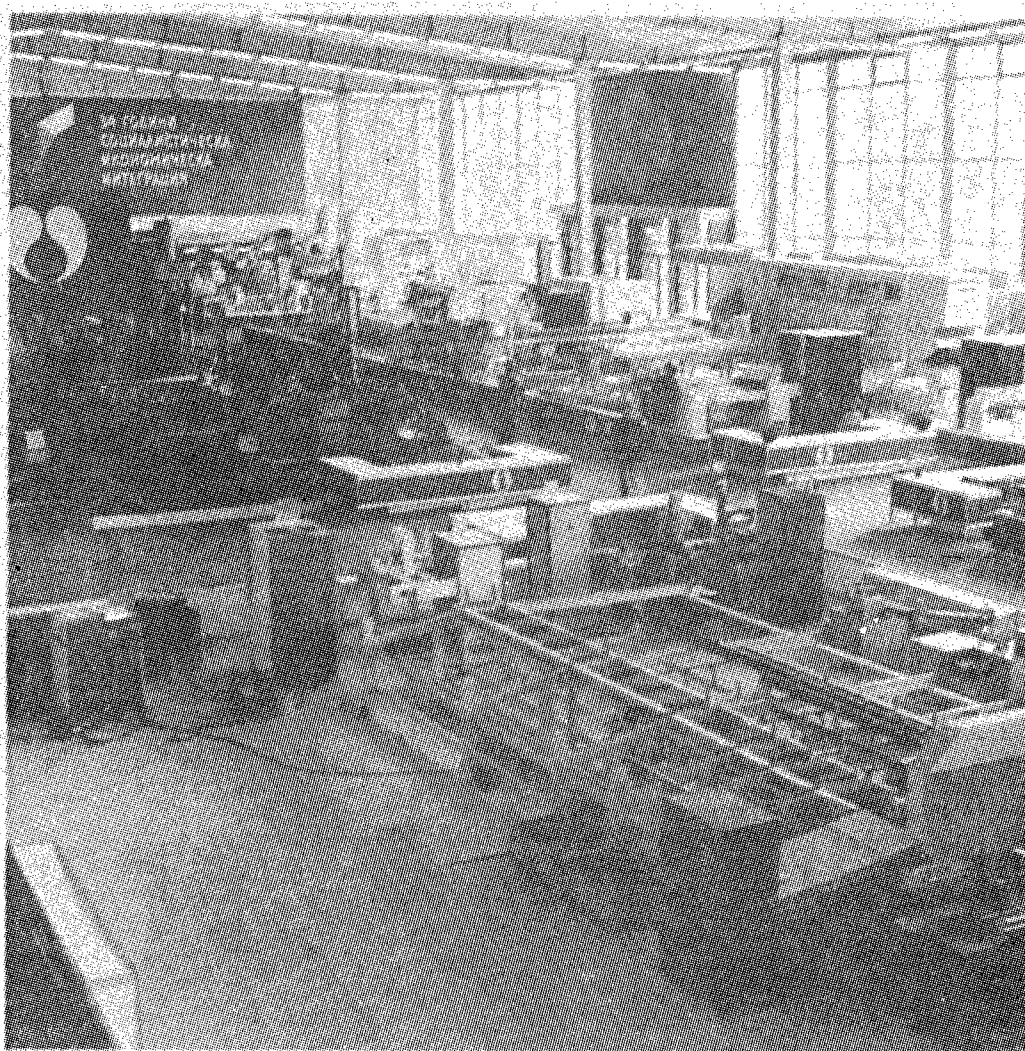
The PROCON 1300 programmer is a means for the designing, attunement, modification and recording of user's programs, carried out by the controllers. The programming is carried out in the SESAM 2 language introducing it by means of a specialized keyboard. The program is shown on the programmer display by means of relay-contact symbols, well-known to automation specialists.

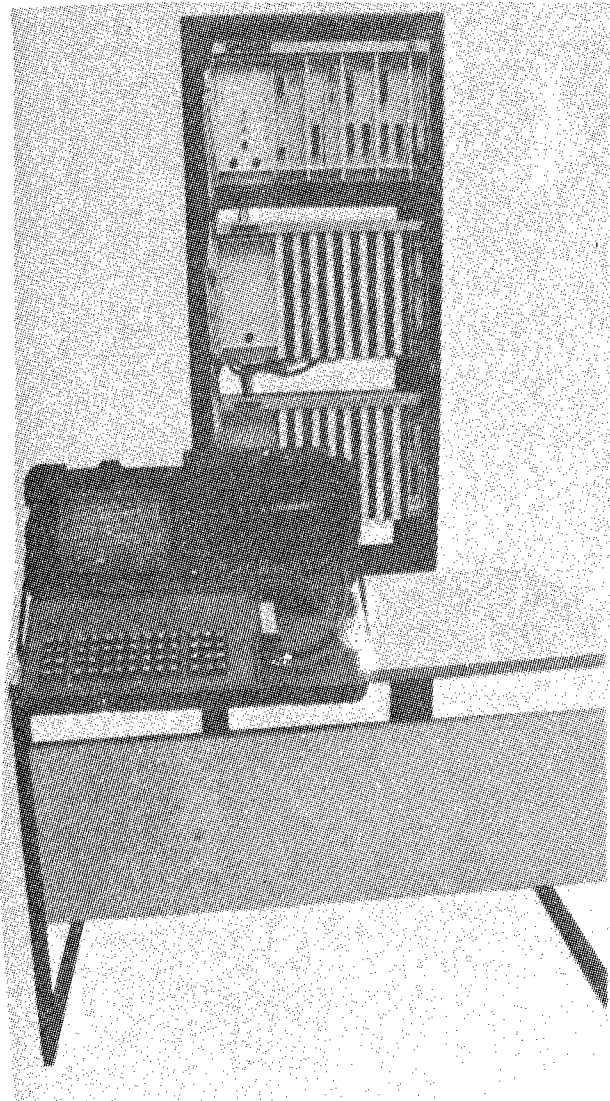
The programmer is sold by itself; it is most convenient for transporting and is an accessory of the controllers when preparing or modifying user's programs.

The PROCON 1310 pocket terminal serves as a channel of access to the data in the programmable controllers. With its help the states of all the memorized operations can be read or modified, and the conditions of work — start, stop or data annulment — can be changed.

The technological parameters of the working process of the programmed objective are given by means of the unified PROCON 1320 operator console and information on its course is obtained by means of a numerical and functional keyboard and numerical indication.

The PROCON programming-technical complex synthesizes the peak achievements of world practice in the sphere of discrete and discrete-continuous technological processes and serves as a means of increasing labour productivity and the quality of production, a means for the attainment of positive economic results.





CSQ: 2202/18

## AUTOMATED ELECTRIC DRIVES DISCUSSED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 12, 13

[Text] Research Institute of Comprehensive Production Automation has gained considerable experience in the study, designing, production and introduction into practice of technical means and automatic control system of electric drives of machines, aggregates and flow lines. Its activities proceed along the following main lines:

a) technical means--information control blocks, power modules, sets of rectifiers and thyristor frequency converters;

b) control systems of electric drives with d.c., synchronous and induction motors; and

c) thyristor pulse regulators for the control of electric truck drive.

A fairly wide range of articles have been devised at the institute. Among them let us mention the sets of thyristor rectifiers for rated currents of 50 to 4,000 A and rated rectified voltages of 220, 440, 600 and 930 V for the control of d.c. motors through the regulation of speed, capacity and internal voltage. The thyristor rectifiers for a rated rectified current of 160, 250, 320 and 500 A and a rated rectified voltage of 40, 100, 160 and 200 V are designed for the regulation of the ignition of synchronous motors, at which the energy and starter conditions are optimized. Thyristor frequency converters for the regulation of the speed of induction motors with a short circuit rotor come in two versions: for a rated power of 40 kVA and 100 kVA in a regulation range of the output three phase voltage of 8 to 50 Hz. A cycloconverter with a rated output current of 700 A and a

range of variation of the output voltage from 9.5 to 13 Hz has been devised for greater capacities.

A solid base of specialized technical means and a competent staff of experts have proved to be a reliable prerequisite for the institute's successes in devising automation systems of electric drives of machinery and equipment in machinebuilding, metallurgy, rolled products, pulp and paper, as well as petrochemical industries. Part of the systems have been introduced during the overhaul and updating of production.

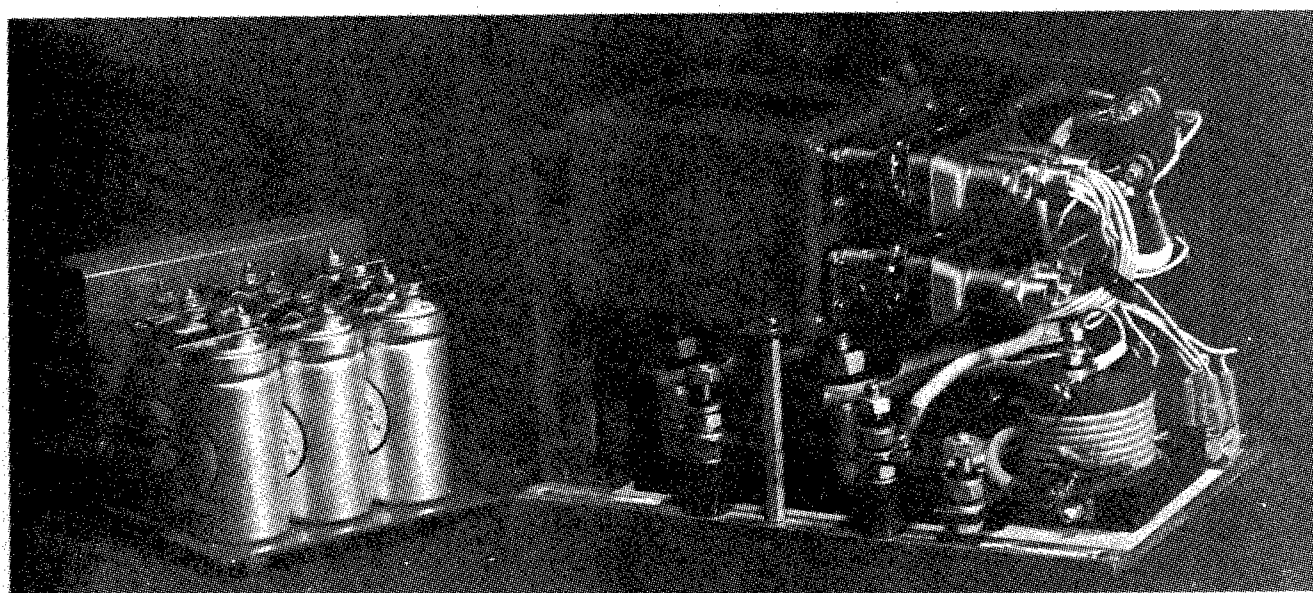
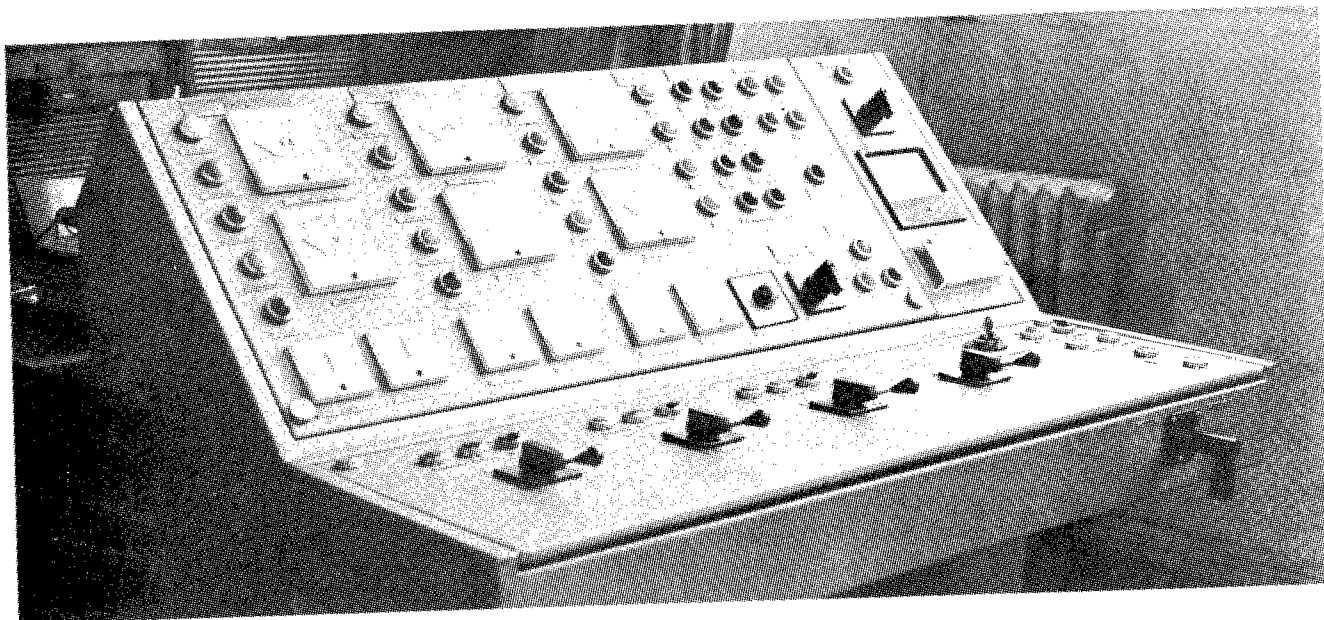
The automatic regulation systems of the electric drives of principal and auxiliary mechanisms of rolled mills deserve special attention. At the Lenin steel plant in Pernik a system has been introduced for the control of the main drive of a 1000-kW rolled mill 1040, as well as a system for the regulation of auxiliary mechanisms made with a 100-kW thyristor frequency converter.

The automatic control system of the regime of electric arc 100-ton furnaces at the Kremikovtsi iron and steel works

realizes a program control of the smelting regime of enhanced precision and rapid action and an automatic control of the furnace convertor. As a result, considerable amounts of energy, revetment and electrodes have been saved.

Major successes have also been scored when introducing systems for the feeding and control of multimotor d.c. electric drives with high synchronization and precision requirements in machines for the production of paper, of equipment for the testing of ship models etc.

The pulse regulators come in three modifications: for the control of the traction motor, the auxiliary motor and the steering device of an electric truck. They permit to regulate the speed smoothly and without losses, to increase the reliability of the contactors, to lengthen the inter-charge run and life of the storage battery, as well as to achieve greater manoeuvrability and productivity. The technical and commercial parameters of electric trucks have been greatly improved following the introduction of pulse regulators as accessories.



## CONTROLLING DISTANT WATER PROJECTS

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 14, 15

[Article: "Automated Control of Distant Hydrotechnical Projects"]

[Text]

Irrigation schemes comprise complex pieces of hydrotechnical equipment located at a considerable distance from one another. This impedes the strict fulfilment of the technological process, causing losses of water and labour.

The research institute for comprehensive automation of production has developed automated control systems for distant hydro-technical projects which successfully cope with these problems. These systems have a hierarchical decentralized structure on two or three levels: local station, dispatcher station and control computer centre. They are suitable for irrigation schemes which extend over an area of up to 15,000 ha, and include a canal network up to 80 km long, up to 20 canal locks, up to eight pumping stations and four levelling basins.

The systems automatically control the transport and distribution of the water from its source to the users, plan and optimize the work of the irrigation scheme and diagnose the state of the hydro-technical equipment.

A microprocessor system has been developed for the lower level, the local station, which makes for steady irrigation and efficient utilization of the water and

the hydrotechnical equipment. This is achieved by measuring the principal technological parameters of the hydrotechnical project: level, pressure and flow of the water, position of the locks. The momentary and summary water quantities are also calculated at certain points of the distribution network. The system automatically generates programs for coping with emergency situations. The operator receives numerical and printed information in real time on the state of the hydrotechnical equipment and the course of the technological process. The processed data is transmitted to the upper level.

The upper level, the dispatcher station, consist of a mini- or micro-computer with a 128 KB operative memory and a videoterminal in which the following functions are performed: reception of applications from users, drafting of a time-schedule of optimal water distribution during certain periods of time, minimization of water losses by redistributing the waters in case of sudden or preliminary rejections on the part of the users. The latter can learn at any time what water quantities have been expended, as well as supplied but not expended.

The operator at the central station can exchange information with the local stations; this makes for a flexible solution of problems.

When the system is built on three levels, several micro-computer stations are included in the control computer centre in order to regulate the operation of large irrigation schemes. Standard telephone lines, radio channels or cable lines are used as communication channels.

Saving water has become a worldwide problem nowadays. Specialists of the institute have solved it as regards water supply for drinking and general household purposes. Available water resources are utilized rationally and averages in the distribution network are detected in good time, thanks to the operational dispatcher systems, which at the same time permit to save energy.

In the sphere of automation of distant projects, the institute also offers automated control system of pollution of the environment, of certain sites or regions, as well as nationwide.

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BASIC MICROCOMPUTER SYSTEMS NOTED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 17

[Article by L. Antonov, Director of Central Laboratory of Automation & Research Instruments at the Bulgarian Academy of Sciences: "Bulgaria Produces: CAMAC Automation Systems"]

[Text]

A range of modules as well as complete basic microcomputer systems corresponding to the CAMAC standard are produced in Bulgaria. These technical devices and systems are on an up-to-date technical level and quite compatible with any CAMAC systems elsewhere. This enables Bulgarian engineering organizations to participate in the construction of complete projects, including automation systems quite up to world standards and in particular to the CAMAC standard. A number of research institutes, laboratories and higher institutes of learning make use of them in the establishment of automation systems in various spheres of science and production.

Thus, for instance, in one of Bulgaria's steam power plants a combustion automation system functions in the caldron aggregates made with CAMAC equipment, which optimizes the combustion process and improves its efficiency coefficient.

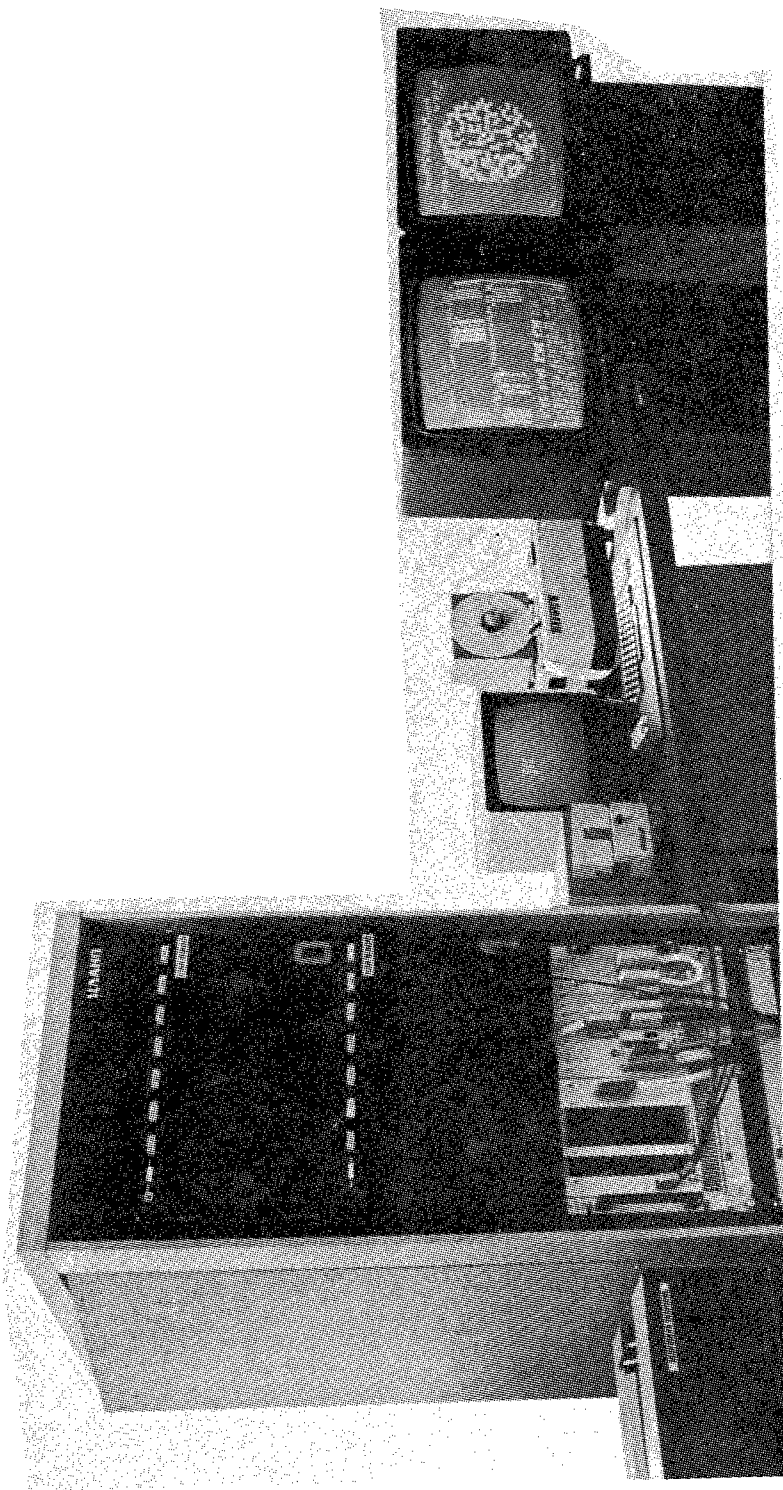
In the Kremikovtsi iron and steel works a CAMAC system has been introduced for analysis and control of the convertor process in steel production, which considerably improves the quality of the steel.

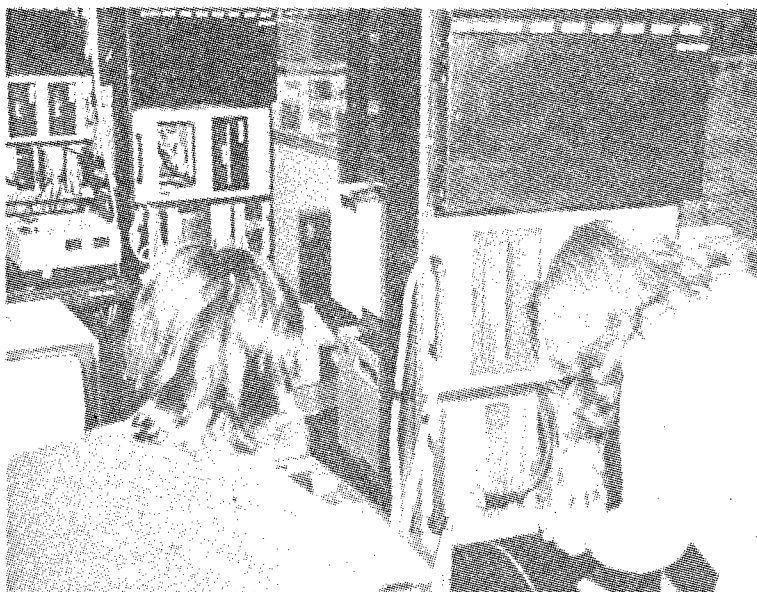
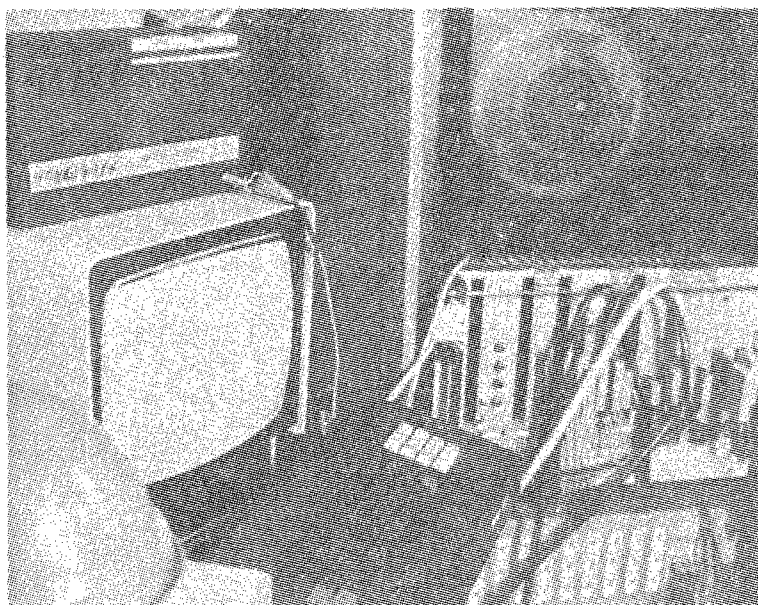
An information system made according to the CAMAC standard is used in the Kozlodouli atomic power plant.

Other types of CAMAC systems are being used in the institutes and laboratories of the Bulgarian Academy of Sciences, in higher institutes of learning and in various enterprises.

Scores of Bulgarian-made CAMAC systems are at present used for automation of research in quite a few institutes of the Academy of Sciences of the USSR.

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## INTERNATIONAL R &amp; D COLLABORATION REPORTED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 18-20

[Article by K. Konstantinov, Chief Expert: "Instrument-Making and Automation State Corporation Participates in International Collaboration in Research and Technology"]

[Text]

Last year an agreement on industrial cooperation was concluded with the Schember Co. in Vienna. On the basis of the documentation supplied by this firm and with its tooling, automatic scales with a multi-revolving head are to be produced in Bulgaria for a three-year period.

In addition to concrete transactions, jointly with foreign trade organizations, Instrument-making and Automation Corp. is now engaged in negotiations on industrial cooperation. There are particularly good prospects for collaboration with the André Leonberg and Dreger companies in Federal Germany and the Legric Co. in France.

Instrument-making and Automation Corp. is an important exporter of energy meters to the developing countries. A number of Asian and African states have become our traditional trade partners. Bulgarian specialists have developed several standard projects for the construction and equipment of instrument-making plants which are to turn out energy meters, water meters and electric gauges.

Collaboration with the developing countries via international organizations has now acquired particular significance. Instrument-making and Automation Corp. is maintaining regular contacts with them along the line of the Industrial Development Organization at UN

(UNIDO). Bulgarian specialists are lending technical assistance along this line in the development of various projects in different countries. A symposium with representatives of developing UNIDO member-countries organized on our initiative, has produced a particularly useful effect. These representatives had an opportunity to acquaint themselves first-hand with the level of our production and developments. Several countries have already shown a distinct interest in joining certain projects. Negotiations are now in progress on sending young specialists from these countries to Bulgaria for training in the field of electronics and mechanics.

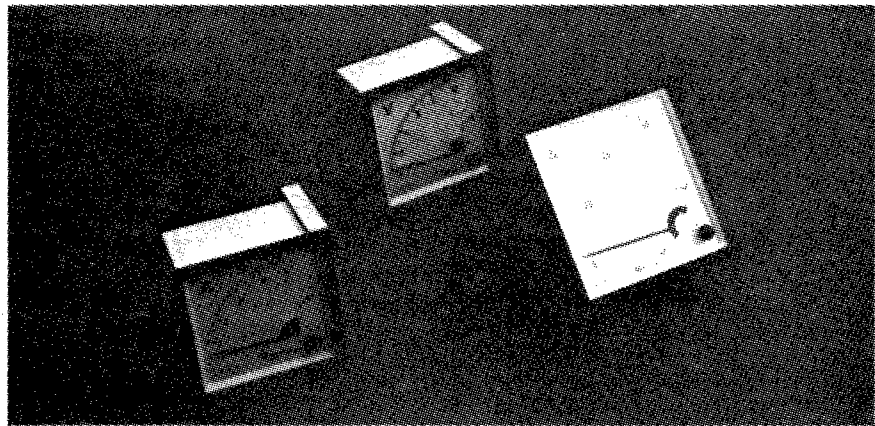
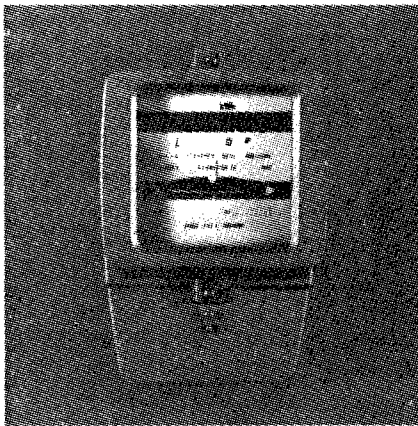
The production list of Instrument-making and Automation Corp. comprises thousands of instruments, means and systems of automation. Collaboration with the CMEA member-states, and in particular with the USSR, plays a major role in the development of this organization, as some 70% of its total output is marketed in those countries.

First in importance rank the bilateral agreements on specialization with the Soviet Union, which have been implemented for over ten years now with the Ministry of Instrument-making, the Ministry of Petrol and Chemical Engineering and the Ministry of Public Health of the USSR. These three

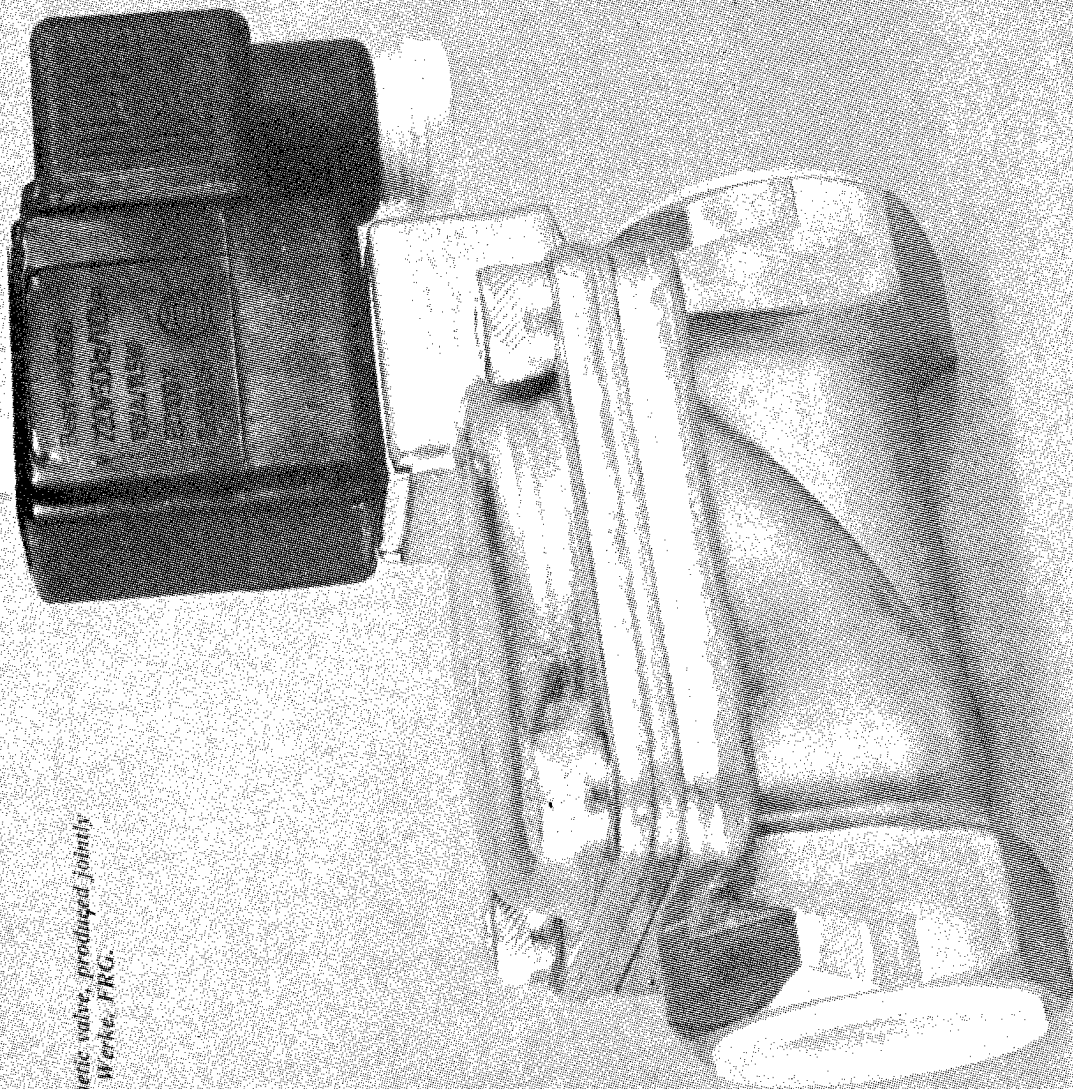
agreements alone secure the marketing of the total output of four plants forming part of the corporation. The agreement on specialization in the production of five-valve batteries has also been running for over a decade, while that on cooperation in the production of electric measuring instruments between the plant in Pravets and the Metra plant in Bansko, Czechoslovakia, has been in force for over five years. Similar agreements also exist with the German Democratic Republic in the field of instruments and means of automation as well as in weight measuring equipment.

Long-term target-oriented programs are now being prepared on the basis of the specialization agreements. The new forms are yielding concrete results. A telling case in point is the SARP system of automatic navigation spacer introduced in the Instrument-making and Automation Corp. as a result of joint efforts with Soviet experts; it guarantees safe navigation and protects ships from collision.

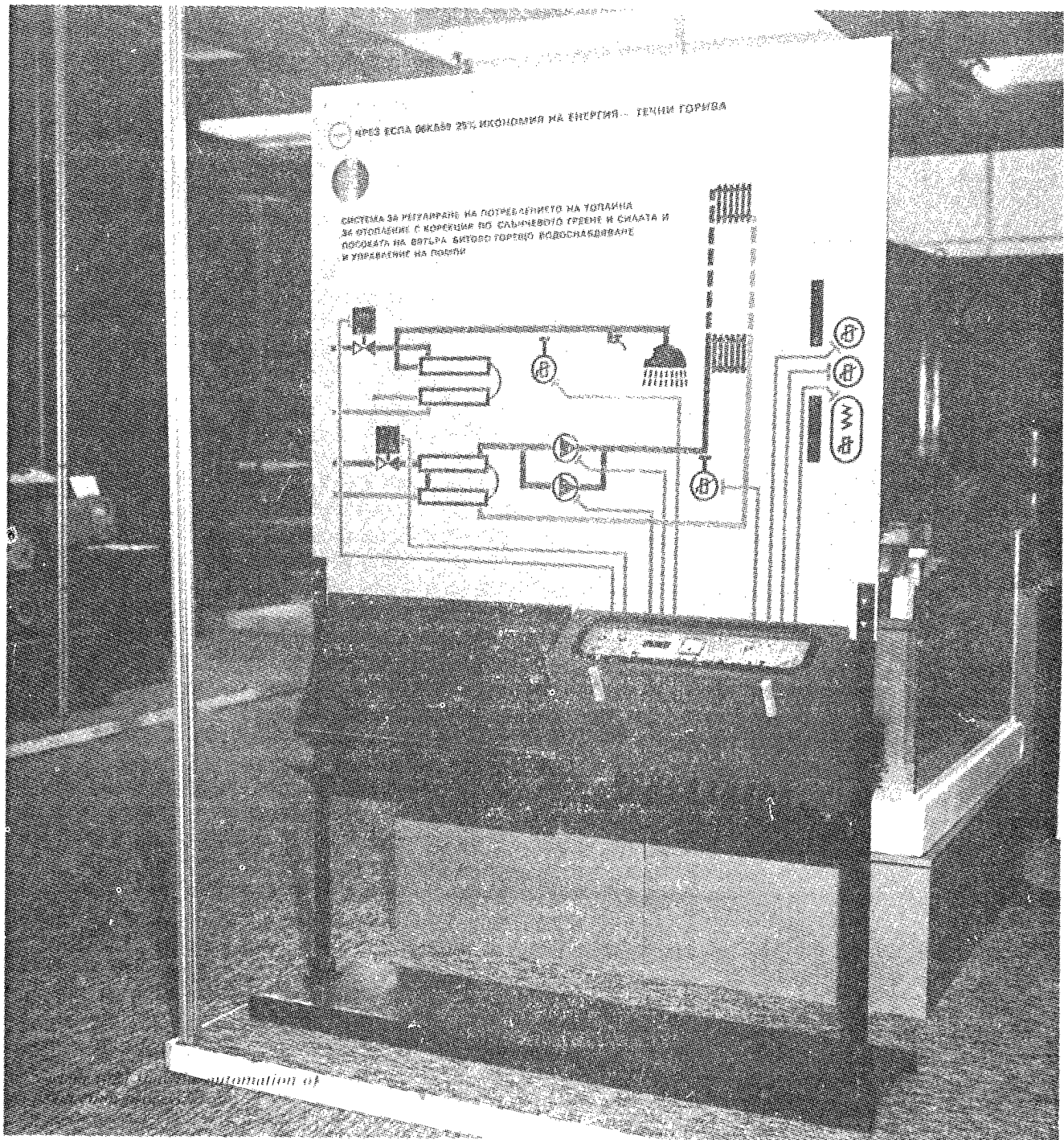
Collaboration with the non-socialist countries is likewise making good headway. Several Bulgarian plants are working after a license from companies in those countries. Most successful in this respect is the agreement with the Herion Werke in Federal Germany, on the basis of whose license electromagnetic valves for the automation of the chemical industry have been in production for over ten years. A large part of these products are exported. A new agreement has been signed with this company, which makes it possible to extend the list of valves produced so far by the addition of valves for aggressive media.



*Electromagnetic valve, produced jointly  
with Herion Werke, FRG.*







CSO: 2202/18

PROGRAMA-1024 DESIGNED FOR COMPLEX PROCESSES

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 21

[Article by Eng. G. Hristova: "Programa-1024 Programmable Controller"]

[Text] The **Programa-1024** programmable controller represents an electronic microprocessor system. Developed at the Instrument-making Institute in Sofia, it is designed for the control of complex industrial processes of a discrete as well as an analog character.

PROGRAMA-1024 is based on the following principles:

**Programmability** — it permits easy adaptation and flexibility when using the controller. The programming is in a comprehensible language, so that all logical functions as well as some mathematical functions can be realized. The user loads his programme by means of a programmer in a dialog mode, enabling observation of the controlled process. The system's software allows basic functions: a) control of discrete industrial processes; b) control of analog industrial processes; c) information on personnel (operational and technological); and d) analysis of state and functional fitness of the system's modules.

**Module organization** — the module construction of PROGRAMA-1024 makes for the utmost flexibility in designing and extending the system to capacity (1024 discrete binary, as well as 64 analog and digital, inputs-outputs). The user can modify and expand the system's configuration up to the moment of designing and putting it into operation, because every module has the necessary functional

and constructive completeness. PROGRAMA-1024 consists of the following modules: processor, power supply, programmer, input-output system, peripherals and high-speed communication highway.

**Focusing on User's Problems** — the programming and build-up of the system's configuration require no special knowledge of computer technology, nor the employment of an operator.

**Decentralization** — the programmable controllers are close to the machines and perform the control functions.

**A Possible Hierarchic Structure** — the computer can be switched in for data-processing and optimization of control algorithms.

**Functional Completeness** — it facilitates the user, imposing no algorithmic and operational unit division. The system's module design makes for flexible, economic and total supply per complete function.

**Optimal Performance of Hardware and Software** — the microprocessor system is based on the sequence of the different stages in adjustment and operation.

**PROGRAMA-1024** finds employment in chemistry, energy, metallurgy, mechanical engineering and other branches of industry. Here are a few examples:



1) Control of outlet water temperature in boilers: the Programa-1024-based loop is designed to maintain the temperature of the hot water.

2) Control of outlet water temperature in a steam heat exchanger using a steady-state loop: the Programa-1024-based open loop is designed to maintain the temperature of the outlet water.

3) Control of outlet water temperature in a steam heat exchanger by a feedback control loop: the Programa-1024-based closed loop is designed to maintain the temperature of the outlet water in a static regime.

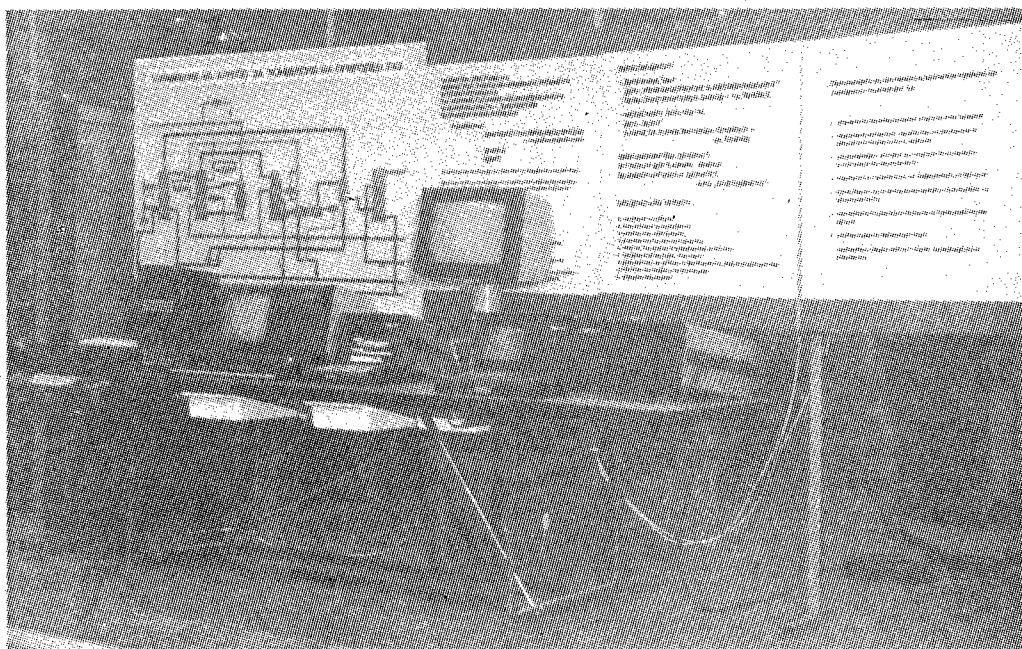
4) Cascade temperature control: the loop is designed to maintain the temperature of the outlet boiler water.

5) Control of two current's ratio: the Programa-1024-based loop is designed to maintain a constant mixing ratio of two liquids in a container.

6) Cascade control maintaining ratio constant: the loop serves to maintain the temperature of the outlet water in boilers, where steam is mixed with cold water. The maintenance of the water temperature depends on the ratio of the steam flow to the cold water flow.

PROGRAMA-1024 finds employment in the development of a system for the control and stabilization of technological processes in the production of antipyretics in the chemical industry, in meat and milk processing, as well as in the automobile industry.

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## ELECTRIC MATERIAL'S EXPORT PROGRAM REVIEWED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 23-26

[Article by Eng. S. Stanev, First Deputy Director General: "Export Program of Electric Materials & Constructive Elements Corporation"]

[Text]

The production of various components for household and professional electronics has been organized in the subdivisions of the Electric Materials & Constructive Elements State Economic Corporation. One of the main enterprises in this system is the plant for electric converters in Sofia which specializes in the production of synthetic quartz, quartz filters, quartz resonators, selenium rectifiers, diodes, cascades and poles. The electronic elements turned out by the plant are distinguished by good quality, reliability and high technical parameters. Quartz and selenium products figure in the export list.

Among the quartz products known abroad, let us mention first of all the synthetic monocrystals. Their technical parameters are as follows: type of crystal — Z block; orientation — leftward with a deviation along the axis of  $0^\circ$ ,  $2.5^\circ$  and  $5^\circ$ ; and Q factor —  $1.8 \cdot 10^6$ . Three crystal types are offered for sale: xx39-50; yy<sup>1</sup> 165-220; and z'z' 22-26.

Quartz resonators have the following technical parameters: frequency interval,  $1 \div 100$  mHz; adjustment precision,  $\pm 10 \cdot 10^6$ ; frequency variation in working interval,  $\pm 5 \cdot 10^6 \div -10 \cdot 10^6$ ; and body type, HC 18/V.

Two types of monolithic quartz filters are offered for sale: MCF 10.7 MHz and MCF 21.4 MHz. The filter for rated frequencies 10.7 MHz comes in several modifications which differ in parameter values: permeance, attenuation and loading index. The 21.4 MHz filter comes in two modifications: MCF 21.4 — 12 DM and MCF 21.4 — 15 DM.

Quartz products are used in computer technology, communication technique and professional broadcasting stations.

Among the selenium products which are highly appreciated on the international market figure the high-voltage rectifiers of the types TV-13, TV-18 and YV-20 with an allowable working voltage 13, 18 and 20 kV, rectified current 0.3 mA, and working temperature  $50^\circ\text{C}$ . They find employments chiefly in TV production.

The production list of the factory for electric converters also includes high-voltage cascades for colour TV sets, types TVK31 and TVK30-816 with the following basic parameters: input pulse voltage, 9.4 kV; output d.c. voltage (without load) 27.5 kV; and rectified current 1.5 MA.

Our experienced engineers, designers and technologists are in a position to

work out development for appliances, as ordered by customers, which are close to the standard production but in smaller series.

The production, applied in radio-technics, telecommunication and computer equipment, is set aside for export to the socialist states, France, Federal Germany, India, Greece, Argentina and the USA.

**The Capacitor plant** turns out over 120 million capacitors per annum, serving a variety of purposes. These include low-voltage, ceramic, ceramic monolithic, disk type high capacitance, starter, plastic and chip capacitors. Most of these products are exported.

**The Resistor plant** produces a.c. and d.c. resistors. The d.c. metal-film resistors are intended for work in d.c. and a.c. circuits in continuous and pulse regimes. Among the a.c. resistors those designed for the fine adjustment of voltage and currents in d.c. and a.c. circuits deserve particular attention; they are suitable for printed circuits (horizontal and vertical) and have an adequate contact system.

**The Ferromagnet plant** produces, among other items, cast and oxide magnets, which are readily marketed in Turkey, Yugoslavia, India and a number of other countries. The new technologies which have been introduced ensure a high quality of the ferrites' magnetic parameters. These comprise ferrite aeri-als and segment magnets for electric motors.

The products of the **Electric Insulation Material plant** find wide employment in signal engineering, electrical engineering and computer equipment. The export list of this plant includes getinaxes, textolites, glass-textolites, foil material and resins, which are in great demand in England,

France, Sweden, the two German states, Hungary, Poland, Yugoslavia, Romania, Iran, Singapore and Australia.

**Lighting fixtures** are another important item figuring in the production list of the Electric Materials and Constructive Elements Corp. The plant in Stara Zagora specializing along this line turns out lighting fixtures for streets, parks and industrial purposes with sodium, halogenic, mercury, metalhalogenic and luminescent lamps; these are marketed primarily in the USSR, Hungary, Cuba, Mongolia and Egypt.

The production list of **contact elements** is fairly long and diversified, comprising micro, program and multi-deck switches, as well as couplings and sockets for integrated circuits.

Last but not least, the corporation's export list includes starter-regulation apparatus for luminescent lamps, electrochemical sources of current and signal apparatus.

**Exporters:**

**Isotimpex**

**Foreign Trade Organization**

**Sofia 1113, Bulgaria**

**51 Chapaev St.**

**Phone: 74-61-51**

**Telex: 22731, 22732**

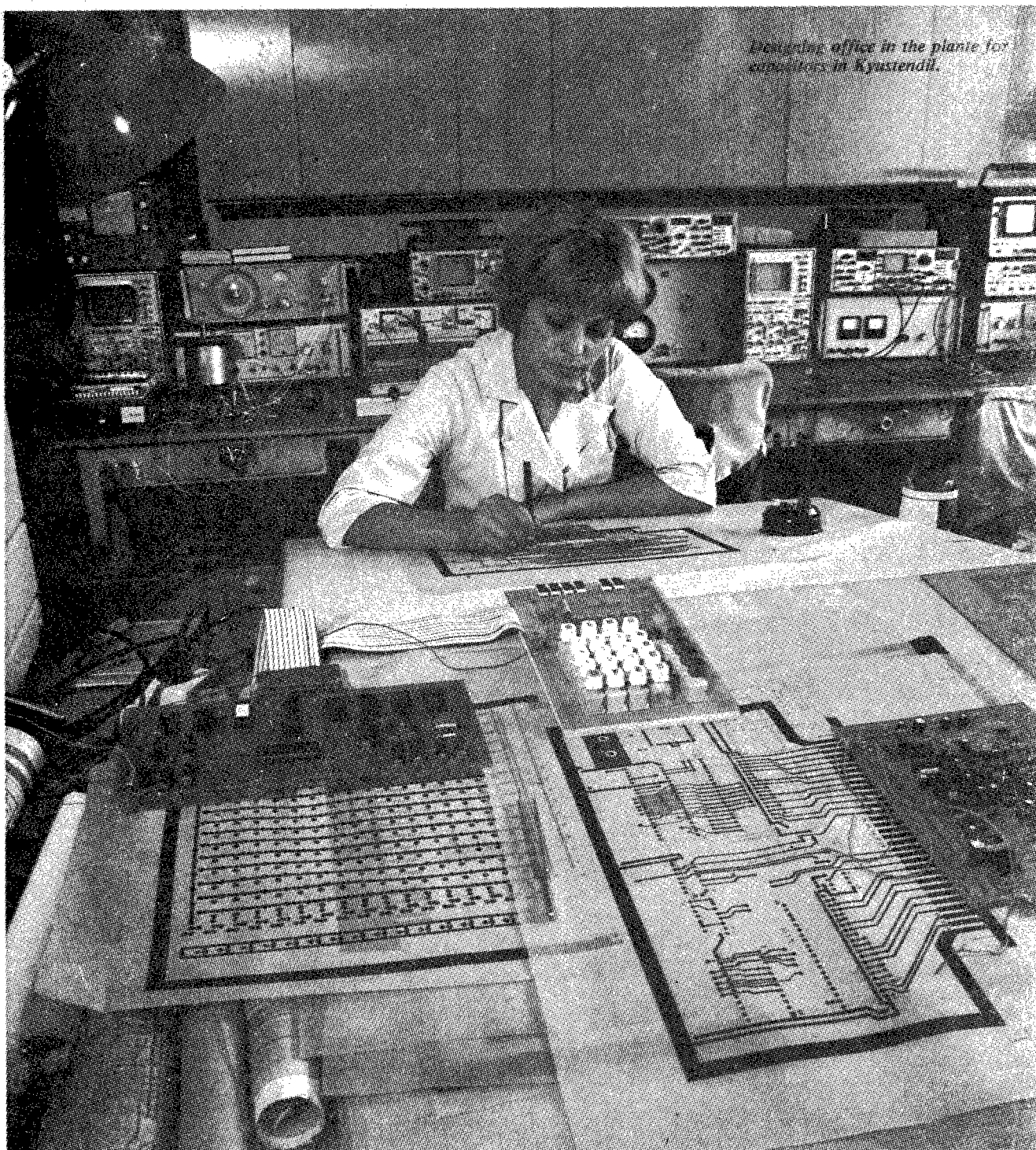
**Electroimpex**

**Sofia 1000, Bulgaria**

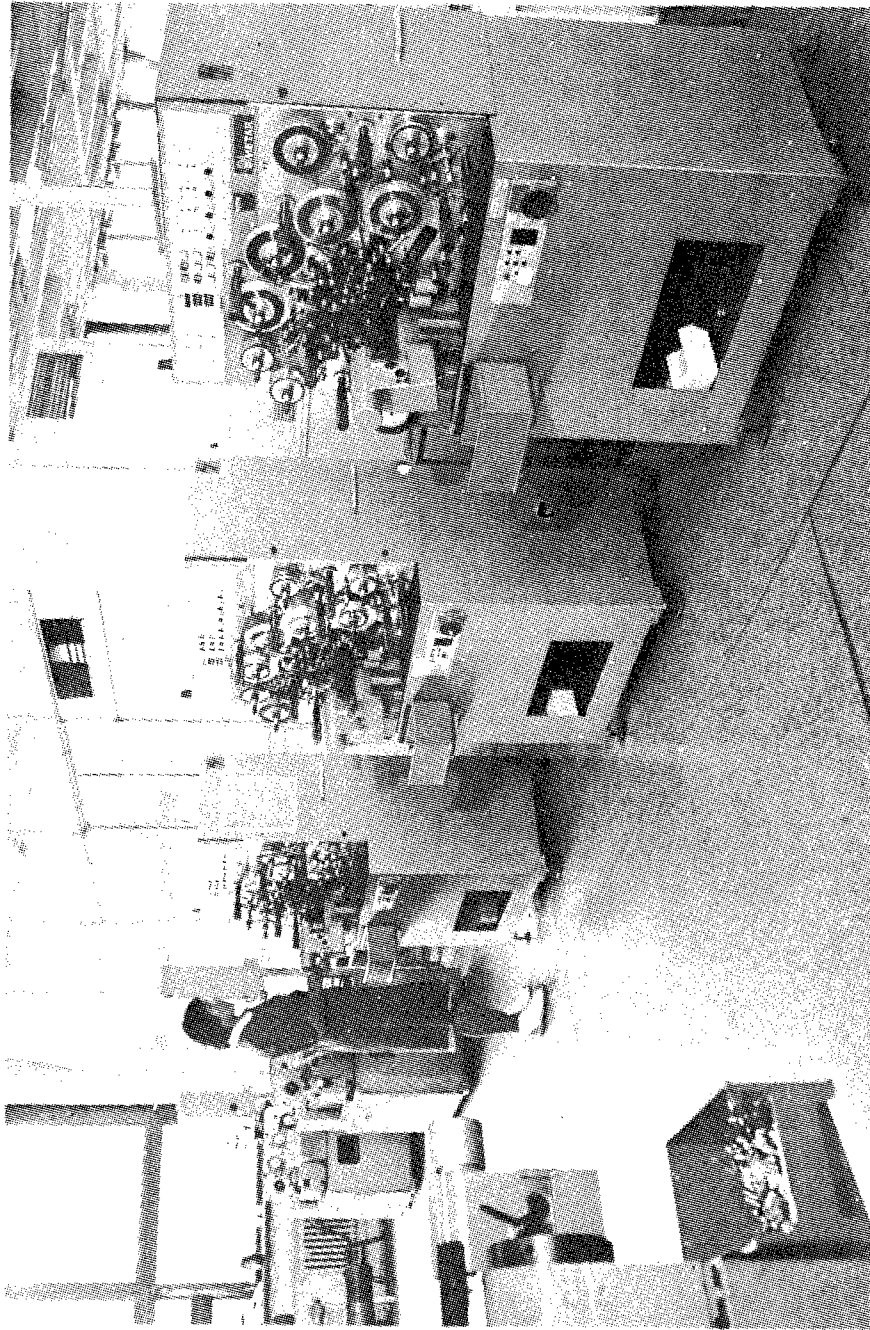
**17 George Washington St.**

**Phone: 8-61-81**

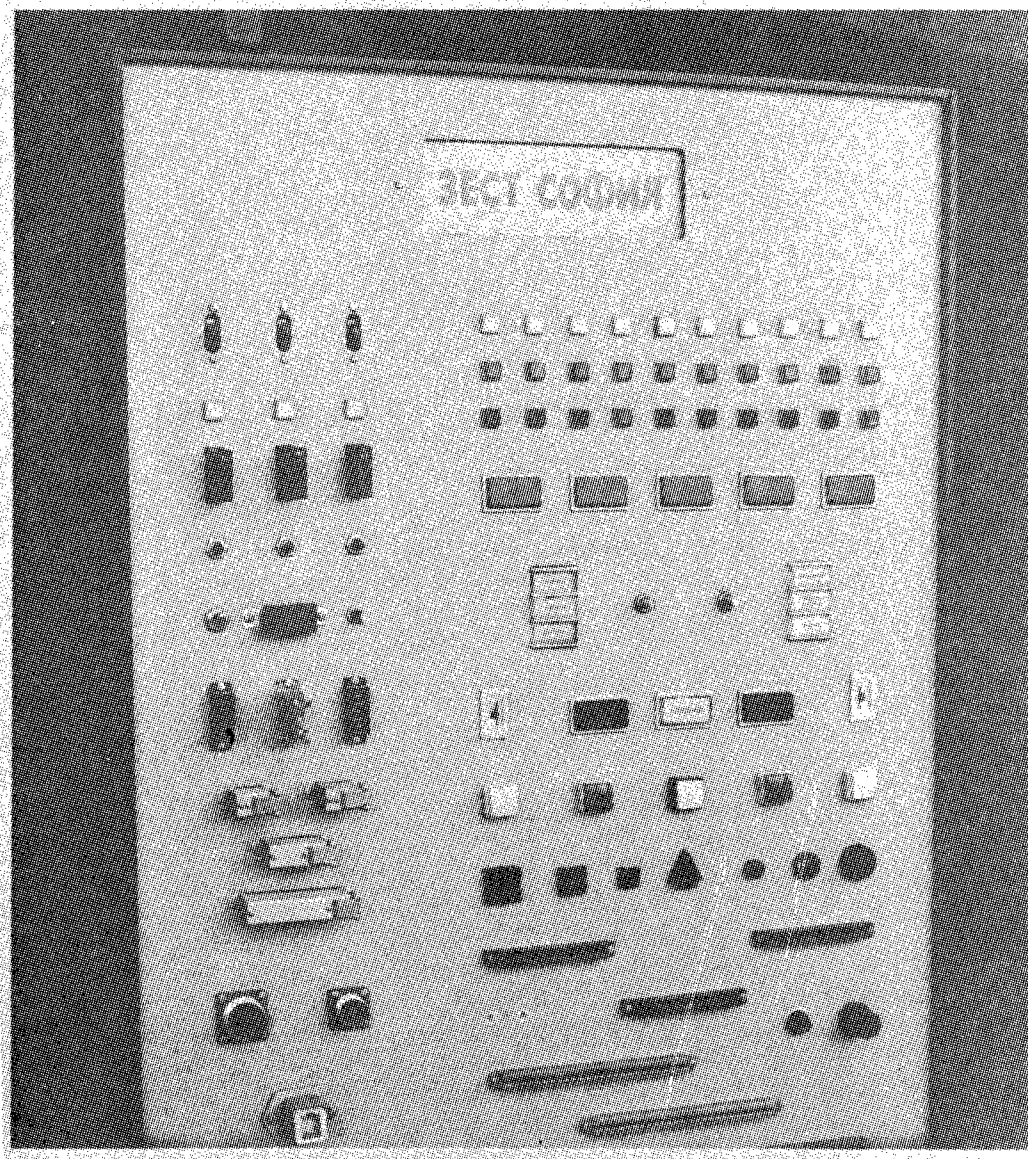
**Telex: 22075, 22076**

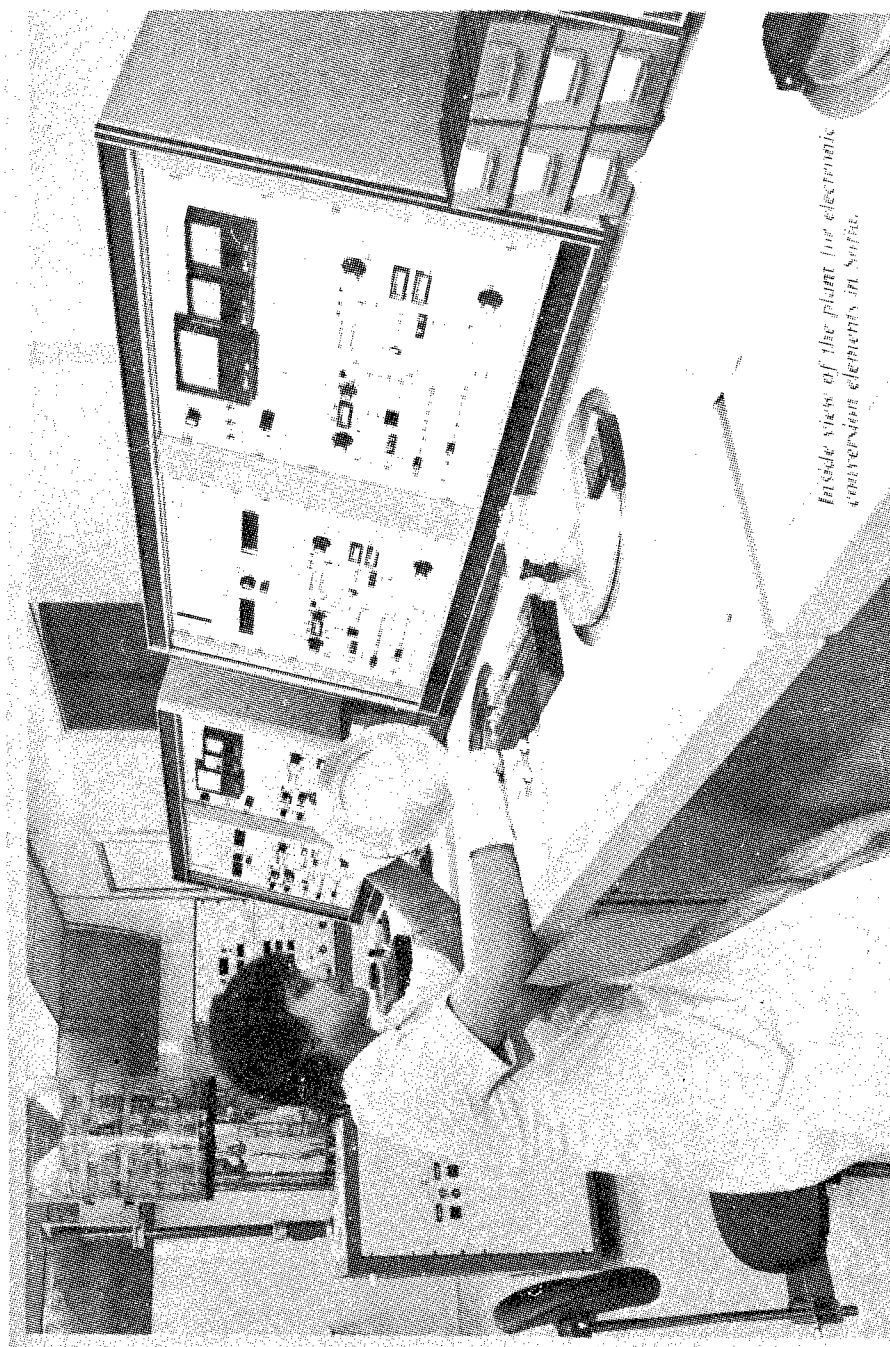


*Working office in the plane for  
computers in Kyustendil.*









Inside view of the plant for electronic  
conversion elements in Sofia.

CSO: 2200/18

## EQUIPMENT, METHOD FOR HIGH SPEED DATA ENTRY

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 27

[Article by Eng. A. Trifonov, Director, Ministry of Machinebuilding and Electronics: "Apparatus and Method for High-Speed Data Entry"]

[Text]

Today information swamps man pitilessly, and man strives helplessly to cope with it. New and high-speed computers and memory devices are making their appearance, but the problem of loading information into the machine has not yet been properly solved. The speed is determined by the operator's capability, but it cannot exceed the speed of the best typist. The information wave has led to a modification of the control structure and to restructuring of administrative services. A managerial decision calls for an analysis of available information, which today only a computer can properly and promptly process.

An analysis of the situation prevailing today in the informational servicing of the population in any part of the globe should make it clear why the Bulgarian invention 'Apparatus and Method for High-Speed Data Entry' has aroused so great an interest among specialists, from operators and stenographers to producers of text-processing systems.

Typewriting is characterized by the use of two or all fingers of both hands. To the typewriter stroke corresponds the printing of a symbol, whether letter, punctuation mark or number, the informational value of the typewriter stroke in monoletter typing is one symbol.

The Bulgarian invention makes use of the stenographic principles of forming the graphic image of words and phrases, which employ far less graphic elements than their orthographic mark. To this fact correspond also fewer writing motions for the graphic denomination of parts of words, words and phrases per unit time. In other words, the stenographic principles account for the superiority not only of the stenographic graphic mark over the orthographic one, but also of the stenographic writing motion over the orthographic one.

The stenocharacter of the stenographic and typewriter strokes finds an expression in the increase of the stroke informational value. To one stroke there corresponds the typing of two or three or more letters, up to an entire phrase of two or three words.

The introduction of these principles is based on fundamental linguistic research. And this leads to qualitative changes in the training process as well. As a result, the training time necessary for the acquisition of a certain degree of typing, respectively stenographic, qualification is shortened as much as three to five times in comparison with monoletter typing and shorthand writing. At that the qualification of the typist and stenographer are integrated into one, the two being acquired

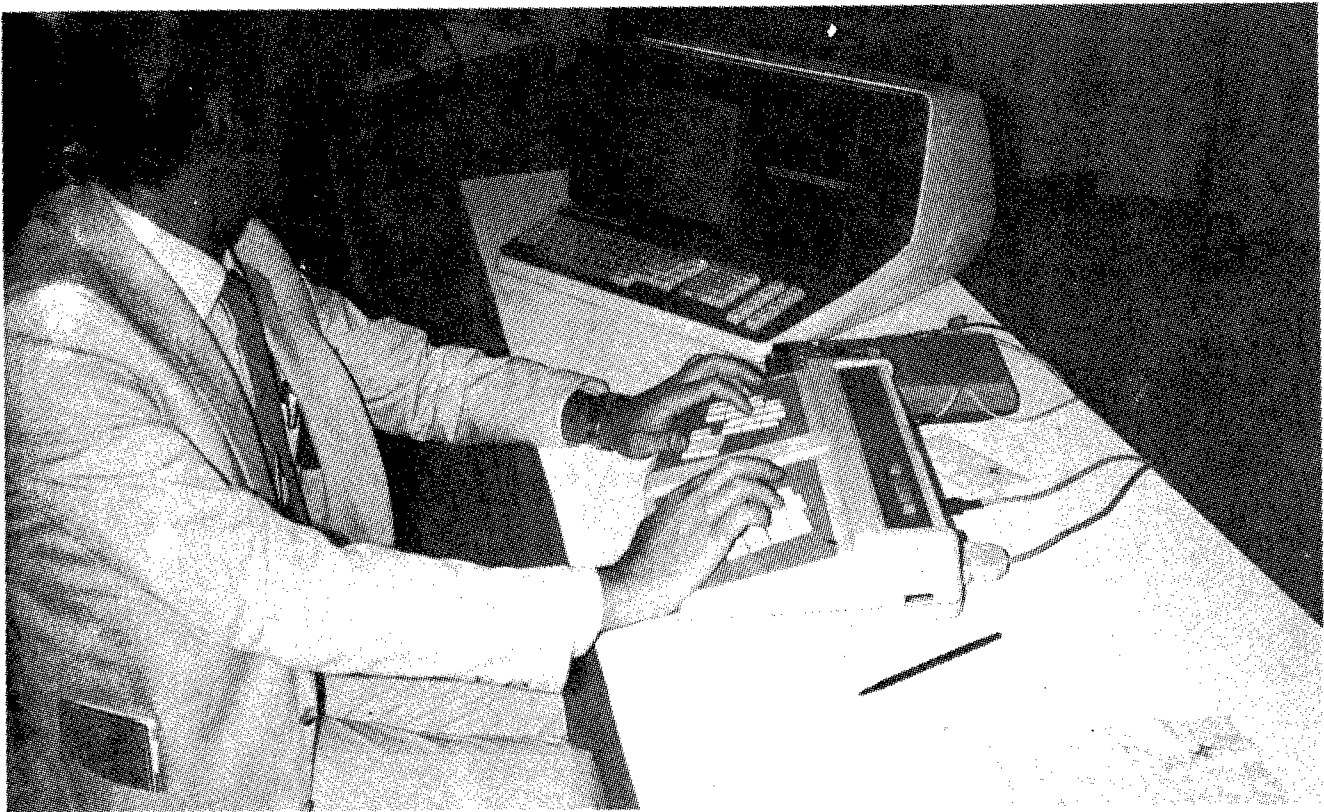


both in the vernacular and in two or three foreign languages. In practice the systems based on this device in combination with a printer and a personal computer make it possible for the participants in international symposia, court sessions and the like to immediately obtain the minutes. The interface inbuilt in the RS 232 device permits to include in it practically all the printers known on the market.

The potentialities of this apparatus and method for speeding up two to three times data entry into a computer was demonstrated by our operators who took part in the international mechanical stenography contests in Belgrade (1979), Mannheim (1981) and Lucerne (1983) at

which they copped the first prizes. Patents for this invention have been issued in the United States, Federal Germany and Japan. In 1983 some 300 participants in the annual conference of the Association of Stenographers in USA welcomed the participation of Bulgaria in the exhibition of mechanical stenographic equipment organized on that occasion.

The daring of Bulgarian specialists shows the way in which a computer can pick up information at the speed of speech (and in the future at the speed of thought) and how the potentialities of computer technology can be tapped more fully.



CSO: 2202/18

## ISSES: PROVIDES MANAGEMENT, ADMINISTRATION SERVICES

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 29-31

[Text]

ISSES, an abbreviation standing for "Information Systems and System-Engineering Services" is an engineering organization at the Committee for Unified System of Social Information (CUSSI) which engages in foreign trade activities on its own.

CUSSI is the foremost user of computing techniques in Bulgaria. It supplies information to departments and organizations on all levels of economic management and public administration. Through its Regional Compute Centers in all district towns CUSSI renders services to over 2000 customers-enterprises, offices and organizations in all spheres of state economy. The Education Center in Informatics to the Committee trains experts in electronic data processing from Bulgaria and abroad-executives, designers, programmers and maintenance engineers. The Computer Service Enterprise of the Committee has a staff of over 500 highly skilled experts. Making use of modern measuring and diagnostic equipment, it installes and maintains computers both at home and abroad. Besides computers of ES and SM series, it supplies warranty and post-warranty maintenance services of computers, measuring and office equipment made by IBM, Hewlett Packard, Hitachi, Fluke, etc.

Relying on the personal and technical resources of CUSSI and in cooperation with other Bulgarian or foreign organizations and firms, ISSES engages in various engineering and foreign trade activities in the field of informatics:

- establishes complete information and control systems by means of modern computers both in Bulgaria and abroad
- exports and imports general and special-purpose software for mainframes, mini-and micro computers
- renders system engineering services connected with the study, analysis, designing, development, implementation and maintenance of systems for electronic data processing in different fields of application
- lends technical assistance by assigning experts in accordance with customers requirements
- offers consultations in the field of informatics and office automation
- performs warranty and post-warranty maintenance of technical devices
- trains customer's staff in the field of electronic data processing.

ISSES offers to its customers reliable high-quality software for data entry and validation; reference information retrieval; finance, banking and insurance; capacity planning and inventory control; computer-edited design and many other application software for different business spheres.

The ISSES experts carry out all the necessary preparatory study and analysis, prepare alternate solutions and, with the participation of the customer, select the most appropriate technical configuration according to the organizational, informational and economic requirements.

Thanks to the experience of its own experts and due to the business contacts with world leading firms-producers, ISSES maintains a perfect functioning of the technical devices which may be home-made or supplied from abroad.

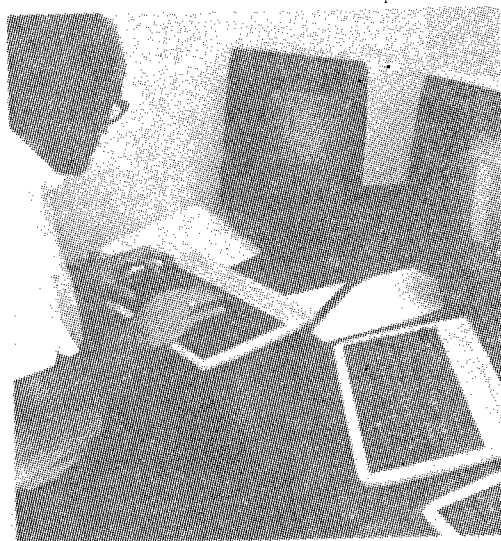
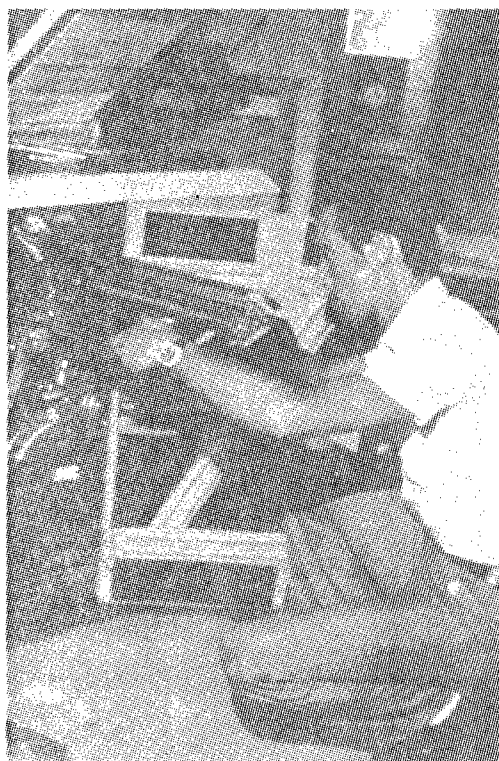
ISSES also carries out the design, implementation and maintenance of the software compatible with the desired information system. Its designers fully work out the software according to the customers' requirements, put into operation the system and train customers' experts to run it. A lot of organizations, enterprises and institutes in Bulgaria rely on the services of ISSES. Our engineering organization en-

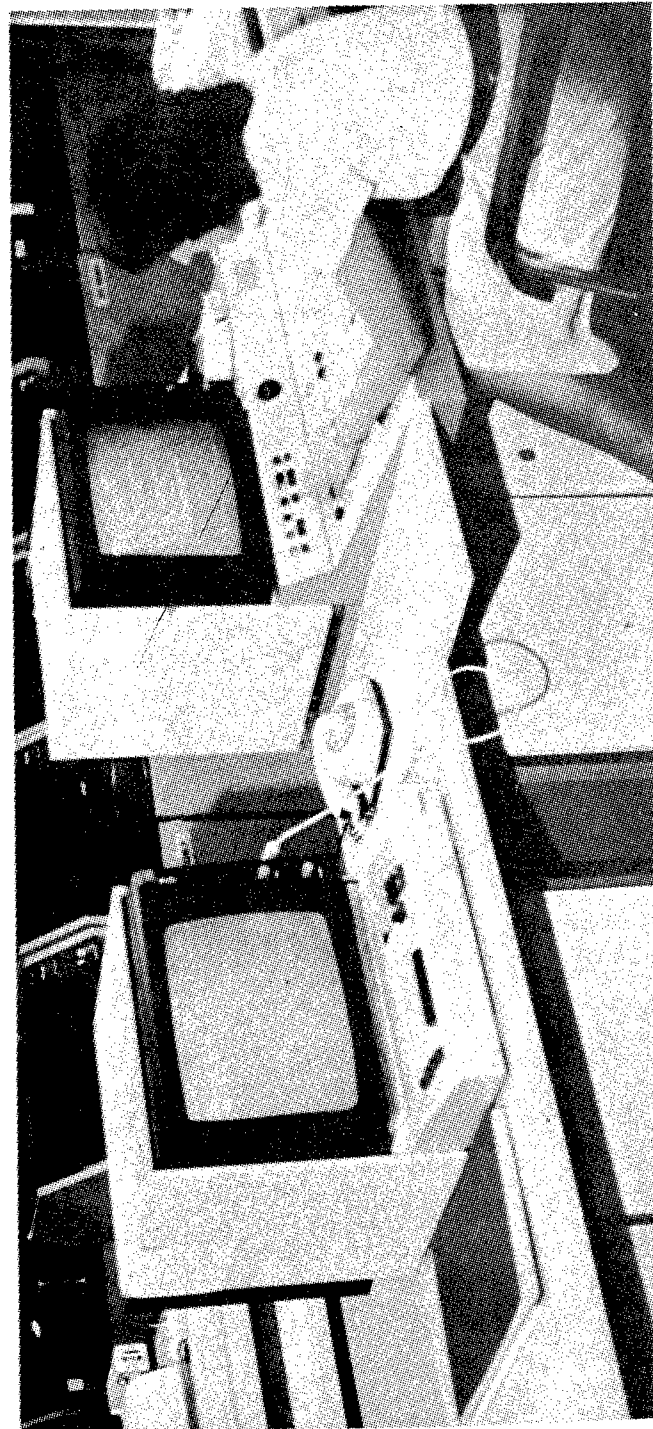
gages in various activities abroad. ISSES is well known in both socialist and developing countries, as well as in the Federal Republic of Germany, France, Greece, etc.

We could and would like to be YOUR PARTNER, too.

Just give us a call or write to us.

ISSES  
2, P. Volov Str.  
1000 Sofia  
BULGARIA  
Telex: 22001 kessibg









Dipl. Eng. Ch. Shekerdjiiski  
Gen. Director

CSO: 2202/18

## NEW DISC CRUSHER DESCRIBED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 34

[Article by Eng. I. Dimitrov: "Disc Crusher"]

[Text]

This Bulgarian invention solves in an original manner the problem of crushing material differing in mechanical properties, various types of ores and minerals in ore-dressing enterprises, as well as in the refractory, cement and other industries. The simplified design is a prerequisite for safety when handling the disc crusher, while avoiding a number of shortcomings of the existing jaw, cone and roller breakers.

The disc crusher is designed for breaking abrasive and hard material, but it can also cope with other non-metallic material. Its working parts, and this is a typical feature of the new machine, have a large mass as well as great kinetic energy and during operation rotate at a high peripheral speed. The engagement angle is variable and can be reduced by increasing the crushing force, which ensures stable and safe work. The working surfaces have the same peripheral speed, making for long wear and tear of the crusher's

replaceable tiling plates. No heavy impact loads requiring a stable fundament occur during operation and the machine can be mounted at various heights, depending on the respective production. The general construction is compact, the units and parts are of simplified configuration and do not call for high-precision machining. The pieces of material fed can range in size from 30-40 to 400-500 mm, depending on the dimensions of the crusher.

The wear and tear of the working surfaces of the disc crusher exceeds two to five times that of cone, roller or rotor breakers, while energy consumption per unit crushed product is 15% less. The design and the possibilities of the disc crusher make it an allpurpose machine, which can be used in roadbuilding, metallurgy, ore mining, production of building material and other spheres. Disc crushers are particularly suitable for the obtainment of mosaic material and for the breaking of material calling for a minimal content of dust.

		DT-400	DT-800	DT-1200	DT-1600
Disc diameter	mm	400	800	1200	1600
Disc	rpm	550	280	210	180
Crushing aperture	mm	1-5	4-15	6-30	8-60
Max size of workpiece	mm	30	60	120	210
Productivity	m <sup>3</sup> /h	0.5-4	12-36	17-88	35-320
Weight incl. el. motors	kg	700	3500	6500	18000

The high operational properties of the disc crushers, their wide range of application in various branches of industry, and their reliability during work in different conditions explain why this new Bulgarian invention has met with so much approval on the part of specialists in this field.

A licence for the production of disc crushers can be obtained from

TECHNIKA

Foreign Trade Organization

Sofia 1113, Bulgaria

125 Lenin Boul. Bl.2

Phone: 702041, 702141

Telex: 23278

CSO: 2202/18



50TH ANNIVERSARY OF SOFIA'S PHARMACEUTICAL FIRM

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 36

[Text]

Recently the pharmaceutical plant in Sofia, Bulgaria's oldest and biggest enterprise for the production of drugs, celebrated its 50th anniversary.

Its production list includes all known contemporary and conventional medicines: tablets, ampoules, syrups, unguents, suppositories, drop forms, powders and ointments. Most popular are the local herbs, from which ready medicines are obtained by in-depth processing. New products of organic and inorganic synthesis are also turned out. Scientific and technological collaboration with the USSR and the other

socialist states is making good headway and contributes to the refinement of the technologies. A number of products of the Sofia plant figure in the list for specialization and long-term delivery in almost all the socialist states. The production list is steadily being extended by the addition of national developments and original solutions. Some 70 per cent of the plant's output is set aside for export and is marketed in more than 70 countries.

We now acquaint you with two traditional products of the jubilee plant.

## NIVALIN DESCRIBED AS FOR NERVOUS DISORDERS

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 37

[Article by Prof. D. Paskov: "Nivalin a Valuable Drug for the Treatment of Nervous Disorders"]

[Text]

Bulgarian folk medicine is distinguished by its variety and originality. It has drawn on the experience of the peoples and tribes which inhabited the Balkan Peninsula: Thracians, Greeks, Romans, Slavs and proto-Bulgarians. Quite valuable information of Arabic origin on the curative properties of plants has also been obtained via the Ottoman conquerors of the Peninsula. But the most interesting elements of this folk medicine have been discovered by the Bulgarian people in the course of their 1300-year history as a result of their sustained efforts to cope with physical ailments by availing themselves of the surrounding rich flora. Even in our days, in the era of an unprecedented revolution in science and technology, folk medicine is a rich source of a purposeful search for new medicines. Significant achievements have been made on the basis of data derived from Bulgarian folk medicine, which have found wide recognition not only at home but also abroad. A telling example of the originality of the creative genius of the Bulgarian people as reflected in folk medicine is the establishment of the curative properties of the snowdrop *Galanthus Nivalis* and of the swamp spring or St. George's Day snowdrop *Leucojum Aestivum*. Since days immemorial the Bulgarians have made use of tinctures of snowdrop blossoms in grape brandy in the treatment of heart

troubles. This method of treatment is still practiced today.

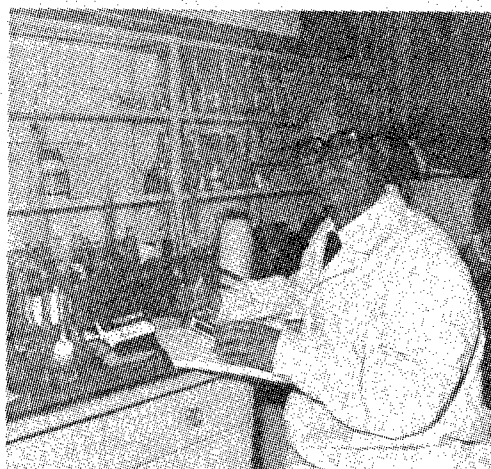
Over 30 years have elapsed since a girl student of mine told me about the useful purposes the snowdrop served in folk medicine by the described method. This was back in 1950. In 1953, together with my assistants, I began experimental studies of the snowdrop which extended over a number of years. As a result we developed a new preparation called Nivalin, which has a selective action on the peripheral and central nervous system, as well as on the skeleton musculature: the transmission of nervous impulses to the connective formations called synapses is intensified. Acetylcholine released from the nerve terminals serves as a go-between for the transmission of nervous impulses between the nerve cells and the muscle cells of the skeleton muscles, as well as in the synapses formed between the terminals of the nerve cells in the central and peripheral nervous system. Nivalin produces its action precisely on the level of these connective formations, synapses, by inhibiting the ferment which degrades the acetylcholine. Consequently, Nivalin utilizes a substance inherent to the organism, acetylchlorine, in order to intensify the transmission of nervous impulses. An impairment in the transmission of nervous impulses to the synapses where acetylcholine is a mediator is fra-

quently encountered in various disorders of the nervous system, such as neuritis, polyneuritis, radiculitis, radiculoneuritis, lesions of the spinal cord by polyomyelitis and other viruses, cerebral attack, traumatic and toxic lesions of the peripheral and central nervous system.

Clinical research has shown that Nivalin is an effective preparation in the case of all these ailments. Thousands of patients have regained their health to enjoy life and become again useful members of society. Patients from many countries have expressed their gratitude for the recovery following treatment with Nivalin. Most expressive was a letter received from M.G. from the Island of Tahiti, in which, after relating the improvement in his health, he concluded with the words: "Thanks and Bravo!"

Today Nivalin has become accessible to whoever stands in need of it throughout the world. Bulgaria is doing its best to steadily expand its production to meet the needs of every single patient.

**Exporter: Pharmachim**  
**Sofia 1220, Bulgaria**  
**16 Iliensko Chaussée**  
**Phone: 385531 Telex: 22097, 22098**



**Prof. D. Paskov**

CSO: 2202/18

## ANALGIN PAINKILLER SAID ON HIGH PRODUCTION LEVEL

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 38

[Article by P. Chervenakov, Head of Laboratory Pharmaceutical Plant:  
"Analgin Production on a World Level"]

[Text]

Analgin (novalgin, algopyrin, dipyrone) is a common medicinal substance with a painkilling effect of a non-narcotic type. It also has a pronounced anti-inflammatory and temperature-reducing action. These assets, along with the almost total absence of side effects, account for its wide use. By itself or in combination, it participates in the composition of more than 140 medicinal preparations.

Analgin production in Bulgaria (the most prolonged multistage organic synthesis effected) was launched in 1959. Its technological schematics of production represents a combination of the then peak achievements in the sphere of chemical processes and their apparatus and technical instrumentation. This has made possible, on the one hand, a rapid expansion of production capacities and, on the other, a guaranteed high quality of the final product. The latter meets the requirements of renowned pharmacopoeias such as FH USSR and DAV-7 Federal Germany. The installation of new capacities in 1967 enabled Bulgaria to emerge as one of the world's foremost producers of analgin.

Improving the production by means of the most up-to-date technical equipment, wasteless technology and attainment of the optimal criteria of quality — this has been the unflagging concern of both the Pharmachim Corp. and the phar-

maceutical plant in Sofia. Some of the specialists at work in the laboratory of that plant deal exclusively with problems of analgin production.

In the past few years a series of new technological solutions have been introduced; having won recognition as inventions in Bulgaria, these have propelled the quality of the analgin produced to the highest level. This drug is now up to the requirements of all the pharmacopoeias in the world which treat this product and, what is more, meets the supplementary requirements of the best-known firms in this field, among which the West Germany Hoechst Co., the chief foreign trade partner.

The development of a new technology (on the basis of 100% pyrasolon) for the production of propyphenazon, a highly active substance which is to become the component of many new effective medicinal forms, may be considered as one of the finest achievements of the pharmaceutical plant in Sofia, which augurs well for its future.

**Exporter:**  
**PHARMACHIM**  
Sofia 1220, Bulgaria,  
16 Iliensko Chaussée  
Phone: 38-55-31  
Telex: 22097, 22098

## BLAGOEVGRAD DISTRICT PROMOTED

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 pp 40-45

[Text]

The district of Blagoevgrad is situated in the southwestern part of Bulgaria; it comprises 5.8 per cent of its territory and 3.8 p.c. of its population. Its most distinctive features are scenic beauty, a Mediterranean climate, a mountainous relief, and abundance of mineral springs.

Today industry is making rapid progress in these parts. As a matter of fact, Blagoevgrad district has now become a centre of the nation's radioelectronic and communication industry. The production of practically all types of electric sound-reproducing apparatus, low-voltage relays, radiotransmitters and radiotelephones, as well as dispatcher and telephone exchanges, has become concentrated here. At present this district turns out components for computers, wood-working machines, automobile parts and other industrial products. The chemical, tobacco and light industry are also well developed.

The period of socialist construction has been most fruitful indeed for the development of agriculture. Radical changes have occurred in the intra-branch structure with priority going to intensive crops. The growth of agroindustrial complexes, in particular their concentration and specialization, has made it possible to apply ever more fully industrial technologies, to intensify integration links with industry, and to enhance its effectiveness.

Tobacco production is the principal branch in this district, the branch which best characterizes its aspect. It occupies 27 per cent of the arable land and secures almost two-thirds (62 p.c.) of the total agricultural output, as well as one-fifth (20 p.c.) of the nation's tobacco production.

Thanks to the mild Mediterranean climate and the relative high mean annual temperatures, the Blagoevgrad district secures the earliest vegetables for the domestic and foreign markets. Among the perennials, grapes and peaches rank first, while in animal husbandry sheep-breeding is the leading branch. Cattlebreeding is oriented primarily toward milk.

Thanks to its scenic beauty and to the nation's policy of specially promoting this once backward region, the Blagoevgrad district has become one of Bulgaria's most interesting tourist objectives. Unique monuments of culture, towns and villages with a particular flavour of their own, as well as the rich local folklore greatly impress foreign visitors. Melnik, Dolen, Pletena, Bansko, Yakorouda and Sandanski have become well known, owing to their architectural and other assets.

This is the nation's most mountainous district. It is here that the three foremost ranges rise — Pirin, Rila and Rhodopes, as well as Belassitsa. The Pirin mountains, in particular, have an inimitable

alpine character, with scores of circuses and blue lakes, age-old white firs and various plants, including the rare edelweiss, accounting for their popularity among hikers, skiers and lovers of nature.

The wealth and variety of mineral springs and the emergence of balneological centres (first and foremost Sandanski, which boasts of one of the finest hotels in Europe) now attract scores of thousands of convalescents in all four seasons from both the country and abroad.

### **Machinebuilding and Electronic**

**The plant for low-voltage relays** in Banya specializes in the production of these articles for the communication industry. Its output list includes, along with the traditional telephone flat relay, circular relays, RID-relays and other small-size components. About 60 per cent of the plant's output is exported to the USSR, Hungary, Italy and the two German states.

**The plant for woodworking machines** in Yakorouda is the only one in Bulgaria to specialize in the production of all-purpose woodworking machines. These are distinguished by a high degree of standardization of parts and units, as well as rich possibilities in operation. Small-scale output and, as a hobby, machines likewise find application. The wide applicability, reliability in work and simplified design account for the great demand for these machines in over 35 countries in Europe and Asia, among which well-known companies from Federal Germany, France and Italy figure prominently as customers.

The chief products of **the plant for measuring instruments and apparatus** are indicator stands, calipers, set-squares, caliper squares, flat-parallel and measures and linear sensors of the Inductosin type. In recent years various types of pneumatic tools for the mechanization and rationalization of some manual operations, applied in the sectors of the economy, have come to play an important role in the plant's production list. Besides standard products, various types of nonstandard measuring instruments and apparatus, as requested by customers, are

also turned out. The plant's output is traditionally exported to the CMEA member-states, but certain types of measuring instruments are also supplied to Nicaragua, Federal Germany, Sweden and France.

**The plant for magnetic heads** in Razlog meets domestic demand for magnetic tape, disk and ferrite heads for recording and reading with computers. The main part of the computers, which contain parts made in the Razlog plant, meet the needs of the CMEA countries.

**The Nikolov plant for loudspeakers** in Blagoevgrad turns out electroacoustic converters, loudspeakers, mikes, sound-reproducing equipment, sound columns, earphones and accessories. Over 30 types of loudspeakers figure in the production list; they have a rating of 0.20 to 80 W and are inbuilt in all types of radiotechnical apparatus. The high quality of these loudspeakers enable the plant to produce a wide range of sound columns and sound-reproducing bodies. Depending on the purpose they serve, their frames are made of wood, plastics, marble or metal. The bipole columns have a rating of 10 to 40 W and a frequency of 40-63 Hz to 16-20 Hz. Recently the marble columns have been arousing considerable interest among purchasers. The marble makes for great attenuation of mechanical vibrations. Even at a 200-W rating, the marble walls do not vibrate. The plant's output is exported primarily to Hungary, USSR, Yugoslavia, GDR, Sweden and Denmark.

The products of **the instrument-making plant** in Petrich are known not only in the CMEA countries but also among users in many countries in Europe, Asia, Africa and Latin America. Its production list has been developing along the following main lines: electronic and electromechanical appliances, low-voltage apparatus, gauges and means for consumption measurement. In the years to come the Petrich plant is to continue specializing along these lines, broadening the range of its products and improving their technical parameters in tune with the latest requirements in instrument-making.

## Light Industry

**The Bilyana Factory** in Petrich is specializing along two lines, in upper woollen knitwear as well as in sports goods and overalls. Garments bearing the Pioneer label are exported today to more than 30 countries in various parts of the world. In recognition of its contribution to the promotion of international collaboration, the Bilyana factory was awarded the Gold Mercury Prize in 1982. Both on the domestic and on the foreign markets it is increasingly imposing itself also with its own Condor label. Its future activities are to proceed along the production of complete sets of sports garments. The growing interest in its products is a result of the fabrics and yarn of natural fibres used. Electronic apparatus is being introduced into modelling. The main production processes have been mechanized and automated. Orders based on models and material submitted by the customer are also accepted.

**The Gotse Delchev textile mill** in Blagoevgrad is one of the oldest enterprises in the whole district. In recent years it has been overhauled and updated. Spindless spinning and shuttleless weaving have been introduced. Cotton yarns and fabrics, as well as mixtures with man-made materials, from which sports garments and overalls are tailored, are produced here. The modern technological equipment makes it possible to abide by all present-day requirements as regards quality and looks of the products. A number of British, American and Indian firms have shown interest in technical cooperation with the Gotse Delchev mill.

## Shoe Industry

**The Bodrost factory** in Blagoevgrad and the **Yako Dorosiyev factory** in the village of Hadjidimovo specialize in the manufacture of sport shoes and Maraton type casual shoes. The upper part is made from natural leather and textile, while the sole is mounted by means of direct extrusion. The modern technologies of production and the use of high-grade material guarantee long wear of the shoes without any visible deformations of the models. Over 40 models are made for all seasons and for different age groups.

## Wooden Toys

Wooden toys are made in the factories in Razlog and Bansko. Original in shape and in interesting colour combinations, they come in a great variety to the joy of the smallest users. They develop not only an aesthetic taste, but also a designing vision and thinking. The parts and units are considerably standardized, so that the toys can be modified in appearance in accordance with the desires of the tots. High-quality wood and harmless varnish coating with guaranty go into their manufacture. As a result, the products of the two factories enjoy considerable popularity on the European market.

**The Aneshti Ouzounov factory** in the town of Gotse Delchev produces zippers and various passementerie articles. Its development proceeds in close cooperation with West European firms, among which Optilon deserves special mention. Metal and plastic (spiral and cast) zippers for the tailoring, knitwear and shoe industry are made in various colours and lengths at the request of the customers. Recently there has been a particular demand for decorative cast zippers, which come in a wide range of shapes and colours.

## Agriculture and Food Industry

The climatic and soil conditions as well as the topography of the Blagoevgrad district have imposed as chief crop tobacco, along with early vegetables, grapes and fruit-growing. The high mean annual temperatures make it possible to obtain in many cases two crops per culture, as well as to promote greenhouse production. The local farm produce is distinguished by high quality indicators, thanks to the more intensive sunshine prevailing in the district. The local tobacco proveniences Melnik, Nevrokop Basma and Gornadjoumaya Basma enjoy a high reputation. The locally grown grapes do not give particularly high yields, but they contain a high percentage of sugar and have a delicious flavour. The well-known Melnik wine has for centuries been spreading the fame of this southern region far and wide beyond the confines of the Balkan Peninsula. Among the other fruits grown here, the most common are peaches, cherries,

apples and pears. The local vegetables ripen 15 to 20 days earlier than in other parts of Bulgaria. Among fresh farm produce, vegetables (field and greenhouse products) rank first in exports, followed by peaches, cherries and grapes.

The character of the local agricultural production has determined the structure of the district's food and tobacco industry. Oriental tobaccos are mainly cultivated here. They undergo various stages of industrial processing before marketing. Some 60 per cent of the tobaccos after on-the-stop manipulation and fermentation are set aside for export or for cigarette manufacture in other regions of the country. The remaining 40 p.c. are turned into cigarettes at the tobacco factory in Blagoevgrad. Equipped with most up-to-date, highly efficient machinery, which maintains a high quality of the cigarettes of the finest blend and rivals the best on the world market, this factory produces mainly for export. The automatic maintenance of the parameters within strictly defined limits rules out the influence of subjective factors. In recognition of its great contribution to international economic collaboration, the Blagoevgrad factory was awarded the Gold Mercury Prize in 1982.

#### **Forestry and Furniture Industry**

Forestry and the furniture industry play a signal role in the economy of the Blagoevgrad district. Since the distant past they have been closely associated with the livelihood, way of life and traditions of the local population.

Forests cover about 60 per cent of the district's territory. Here are to be found the Pirin Mountains, as well as the southwestern slopes of the Rila and part of the Rhodope, Belassista and Orgazhden mountains. The Pirin National Park enjoys great popularity not only among mountain-climbers and skiers, but also among botanists, for some of the finest plant vegetation reserves are to be found here. Among them best-known are Parangalitsa, Boayovi Douпки, Alibotoush and Tissa.

The Blagoevgrad district ranks second in Bulgaria in the yield of wood, the an-

nual output amounting to some 400,000 cubic meters, of which 60 per cent coniferous and 40 p.c. deciduous. Some 140,000 m<sup>3</sup> of wood and 650 tons of obtained per annum. The production resin are of substantial quantities of herbs, mushrooms, chestnuts and blueberries has been organized. Some 300,000 m<sup>3</sup> of coniferous and deciduous round wood are processed annually in the local factories which turn out sided wooden material to meet the needs of construction, furniture industry and other branches of the district's economy.

**The Pirin factory in Bansko**, which specializes in the production of chairs, enjoys considerable popularity. Equipped with modern technology, it turns out over 30 different kinds of upholstered and non-upholstered chairs, chiefly for foreign markets. In the future this factory is to specialize in the making of sets of tables and chairs from solid wood or chip-board.

**The Arso Poptodorov factory in Blagoevgrad** specializes in the production of veneered furniture, bookcases, sideboards, cupboards, entrance-hall panels and telephone stands.

**The Yavor factory for household articles in Petrich**, which specializes in turned chairs and tables, hall furniture and highly appreciated stylish suites, faces prospects for the future that are distinctly bright.

#### **Marble Production and Processing**

Bulgaria's biggest marble deposits are to be found in the Blagoevgrad district. This predetermines the development of its production and processing for the needs of construction, domestic purposes and the souvenir industry. The high quality of the local marble has imposed the district as a supplier of blocks, slabs, souvenirs and jewels to quite a few countries. First in importance ranks grey marble, followed by white marble; marbles in various other colours are likewise obtained in appreciable quantities. Recently aragonite, which is distinguished by interesting gnarl formations and colour combinations, has commenced to be used in the production of souvenirs and jewels. The production list of souvenirs and jewels is being renew-



ed annually by over 50 per cent, and their manufacture in combination with nonferrous and precious metals has made them a favourite both on the domestic and the foreign market. The fashion trends are felicitously blended with motifs from medieval national Bulgarian adornments. Telephone stands as well as telephone sets made from that beautiful mineral aragonite in combination with metal have been arousing considerable interest of late. Tables in contemporary baroque and Bavarian style with marble tops, designed for comfortable appointment of homes and representative public buildings, have won great popularity on the international market.

### Chemical Industry

The Blagoevgrad district's chemical industry supplies Bulgaria with pulp and paper, dressing, cosmetics, phytochemical medicines, as well as plastics for industry and domestic purposes.

**The factory for dressing** in Sandanski is one of the first in the world to use, in collaboration with the Bulgarian Academy of Sciences, algae in the production of phytochemical medicines.

**The factory for the processing of plastics** in Gotse Delchev produces more than 30 different plastics for household purposes. Plastic corrugated cardboard finds wide employment in the wrapping of a wide range of industrial and agricultural products, as well as in the construction of greenhouses which have proved to be superior to those made of glass or of polyethylene foil. New capacities are now being installed in this factory for the production of light and heavy polymer nets as well as for expanding the volume and broadening the range of extruded products and articles for household purposes.

The output of the district's chemical plants is exported to the CMEA member-states, as well as to Greece, Yugoslavia and several developing countries.

One of the leading industrial enterprises in the Blagoevgrad district is **the pulp and paper plant** in Razlog. It was built with Soviet assistance and put into operation in 1974. Modern technology is being used here in the preparation of special paper employed as a smooth layer in the billeting of cardboard. The high quality indicators of the primary raw material, coniferous pulp, and of the final product account for the great demand for these articles in many socialist and non-socialist countries. At present this plant is being updated in a big way by means of comprehensive automation and computerization. The introduction of an automatic control system of technological processes with computers is now under way on a compensation basis in cooperation with leading Finnish companies. The long-range plans for the future reveal bright prospects for an expansion of exports as well as for industrial specialization and cooperation.

### Local Industry

The production list of the local industry comprises a wide range of articles. Among them particularly popular on European markets are the Christmas tree decorations, leather fancy goods, Persian carpets, ready-to-wear, small wooden articles and spring-locks.

An appreciated business partner is the **S. Milenkov factory** in Blagoevgrad, which produces over 200 different pieces of luggage, sport, deluxe and student's bags of natural and artificial leather and textile, in combination with smart metal facing, zippers and accessories.

Within the framework of the overall intensification and intellectualization of national production, a broad program for the mastery of leading world know-how in the different branches of industry and agriculture is now being carried out in the Blagoevgrad district. This is an important pre-condition for a further expansion of the export potential of this attractive and rapidly progressing province of Bulgaria.

## EXPANDING BULGARO-MEXICAN ECONOMIC TIES

Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 48

[Text]

Bulgaria exports to Mexico chemicals, soda ash and fertilizers, and imports spices and certain consumer goods from that distant country. The prospects of economic relations are now determined by some new forms. Bulgaria is planning to establish two agroindustrial complexes in the state of Guerrero, within the framework of which combines for sterilized canned goods and fruit juices, as well as a model fruit-vegetable sector, a fodder shop, a packing plant and an enterprise for vegetable processing are to be built.

An agreement was concluded, according to which the Bulgarian Agrocomplect Engineering Economic Organization is to lend assistance in the development of viticulture in the state of Zacatecas.

New types of vessels are to be built in 1984 after blueprints of the Shipbuilding Institute in Varna. The building of a 15,000-ton ship attaining a high speed (17 miles per hour) will be completed at the Varna shipyard. It will have a high degree

of automation, unmanned operation of the engine-room, cranes and heavy-load jib. The new vessel will be able to serve a variety of purposes, transporting any kind of goods, citric fruits and containers, as well as cars. Amenities for the crew are on a high level.

In the Ivan Dimitrov shipyard in Rousse a new type of 5,000-ton tanker for river and sea navigation is to be built, and another one of this type is now under construction at the Iliya Boyadjiev shipyard in Bourgas. What characterizes these two vessels is that they are being built in accordance with the specific requirements of the customer, the USSR. They are most convenient for the switching from river to sea and back which means avoids reloading operations. The designing and working documentation of a new 6,000-ton combined tanker-freighter to be built at the Varna shipyard, as well as of a 3,300-hp river push-boat and a 3,000-ton dry goods cargo, have been completed.

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Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984, back cover

[Advertisement]

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## BRIEFS

BULGARO-GDR COLLABORATION--During high-level talks between the two countries it was stressed that there exist considerable possibilities of extending collaboration in microelectronics, computer technology and communication systems. New agreements were concluded which trace out the main lines of development of key importance to raising the technical level and the efficiency of the engineering sector of both the Bulgarian and the GDR economy. It was also decided to establish specialization and cooperation in the production of computer equipment, supplying the computers with programs and elaborating specialized complexes. The plans provide for joint efforts in the sphere of low- and high-voltage apparatus, electric insulation material, electrical engineering products for household purposes and nonstandard equipment for power engineering. Initiatives were mapped out in the field of communication equipment, constructive electronic components and control devices for robots and machine tools. [Text] [Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 48]

ISAPLAN INVENTIONS--Bulgarian specialists have designed three generations of welding systems in nearly 20 years: planetary devices for feeding of continuous electrode wire. The latest invention in this sphere is a "Modular Wire Feeder" which completes the range of the third-generation systems, including for robotic welding. The inventions started in 1965 when the first device for wire feeding was submitted for approval before INRA (Inventions and Innovations Authority). Practically every year ever since something new makes its appearance, which is implemented and renders still more perfect the product known by the name of ISAPLAN, which comes in three versions. The technical parameters of these developments represent world records as regards the distance of feeding of the electrode wire. The new water-cooled welding device makes it possible to operate up to a distance of 16m with a 400A welding current. [Text] [Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 48]

AGROMASH SESSION--The executive council of the Agromash International Co. recently held its 40th session in Varna. A plan was approved there for research work on new machines up to 1985 and up to 1990. Bulgaria is to work on six themes: machines for picking tobacco, grapes, fruits and vegetables. The partners in the company have shown pronounced interest in Bulgaria combines for fruit-picking, whose production has been launched in a plant in the town of Stamboliski. In Bulgaria there is a national program

for the manufacture of small farm machines. Their base is a gasoline and diesel motorblock made in the Anton Ivanov machinebuilding plant in Plovdiv, as well as 25 types of accessory machines which are to be produced in various Bulgarian plants. [Text] [Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 48]

PHARMACHIM PRODUCTION--In 1984 Pharmarchin is to launch production of highly effective preparations against certain diseases in domestic animals and birds, developed with a Bulgarian enzyme. Many other new products are to be introduced, including corticosteroid hormones which are particularly efficacious in cases of allergic shock. Ocular medicinal lamellas, developed jointly with the USSR, are also to be produced. [Text] [Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 48]

ELECTRIC HOIST PLANTS--Balcancarpodem Foreign Trade Engineering Co. was set up in the middle of 1983 on the basis of the production and export potential of the electric hoist plants. Its establishment means that favourable conditions exist now for linking production with the market, as well as for consolidating development work and introduction into practice of the requirements of users abroad. Integration with the CMEA countries is being intensified, in particular with the Soviet Union, where in the next years a considerable increase in deliveries is to be realized. The company also maintains fruitful business contacts and has won a place on the markets of many Western and developing countries, in particular Italy, Spain, Portugal, Great Britain, Canada, Finland, Austria, Turkey, Syria, Iran and Egypt. [Text] [Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 48]

TOURISM GROWTH--Bulgaria's scenic beauty is attracting growing number of guests from abroad and is rendering the popularity of our country among well-known foreign tourist agencies ever greater. According to data published by the Committee of Social Information at the Council of Ministers, in 1983 Bulgaria was visited by about 5.8 million foreigners, an increase of 124,000 over 1982. The growth rate of tourists from Poland, Hungary, GDR, as well as from Belgium and Sweden, has been particularly high. In the first nine months of 1983, Bulgaria has had 648 functioning hotels with a total of 105,000 beds, or 1.6 percent more than in the corresponding period in 1982. [Text] [Sofia BULGARIAN FOREIGN TRADE in English No 2, 1984 p 48]

CSO: 2202/18

DATA BANK COMPILED FOR ACADEMY OF SCIENCES

Budapest MAGYAR HIRLAP in Hungarian 4 Aug 84 p 9

[Article by Istvan Palugyai: "A Data Bank at the Academy"]

[Excerpt] Up to now the Hungarian Academy of Sciences has not had a publications data bank for its own publications. But a group of experts has now made up this deficiency in part. Doing basic work, it has collected the scientific articles from the natural science, agricultural and technical research sites of the academy. So this data bank is ready, with a record of all the publications of domestic institutes and university research groups in this area which have appeared over the last 7 years and which are newly published. But the achievements of non-academy research sites do not figure among the articles, books and book excerpts appearing in the data bank. So the data bank is not at all complete, but it is a great step forward from nothing. The academy probably recognized this when it awarded the Youth Prize to two young experts among the preparers of the data bank, Lilian Vasvari (Mrs Biro) and Andras Telcs, of the library of the Hungarian Academy of Sciences.

"A person might think that only patience is needed to compile a data bank, and the rest would take care of itself, with possession of the finished data."

"It is not at all so simple," answered Lilian Vasvari, "if only because the data mentioned are not at all 'in hand'; the compilers must get them. And they must decide what they are, too. We took as a model the data processing mechanism of a large American data bank, which was also good because in this way the data stored in the two systems can be compared. This American data bank was the SCI, the first in the world which also took into consideration quotations from the authors. So we had something to conform to. This significantly facilitated our collection work. Despite this, it was not simple to process the material of past years. In response to an order from the first secretary, every institute sent in a record of its own publications, but in most cases these were very unkempt, and sometimes were defective, too."

"I suppose that putting in order the materials sent in was one of the most difficult phases of your work."

"We gathered together about 10,000 publications," said Andras Telcs, a

mathematician dealing with scientific analysis. "It turned out that in 5 years our researchers had published in about 1,200 journals. In our data bank you can search for these articles on the basis of author, title of journal and year of publication, and key words characterizing the content. We filled out a code sheet suitable for data recording on every article, and all essential information is on the code sheet."

"Which, naturally, did not take place without a computer..."

"We worked with the modern IBM computer of the academy and a data base management system for it. A group consisting of computer technicians fed the data into the machine. To operate the data bank we have so-called search and sort programs. Indeed, there is also a supervising program which checks before input whether the data are correct."

"Who can use the data base, and how?"

"IBM computer terminals can be found in a few research institutes of the academy. From these one can contact, over a telephone line, the center in the SZTAKI/Computer Technology and Automation Research Institute/. If someone gets free 'machine time,' which is not easy considering the present use of the computer, one can also inquire on the spot in the SZTAKI. Earlier, one could get at the data only with our intervention; but now the system is accessible without our supervision. This is one of the things we are proud of. There are not many data banks in the country the use of which does not require intervention by the operators. If someone asks for the complete publication of a researcher, we naturally send the requested data by mail."

"How many people have used the data bank thus far?"

"Only a few," said Lilian Vasvari. "The Central Physics Research Institute has made use of the new service once or twice, but except for them virtually no one."

"Not long ago I was talking with a young physicist acquaintance," Andras Telcs related. "He was starting on a new research topic but did not know how to begin, not having the appropriate professional literature. I pressed into his hand the appropriate index of an international data bank, and he had the key to go on."

The new data base may also be good for something that many have frequently complained that we lack. One can measure the value of scientific performance with it. By comparing the Hungarian data to the data cited in the American base it may become clear to what extent the several domestic institutes are getting into the international front rank. I mention this example because those who prepared the Hungarian data bank performed a similar comparison earlier with paper and pen. Now they can use the computer, too.



COMPUTER DEVELOPMENTS, PROSPECTS OUTLINED

Application of Popular ZX81 Computer

Warsaw INFORMATYKA in Polish No 5, May 84 pp 13-16

[Interview with representatives of the Polish Ameprod Foreign Enterprise, Wojciech Lipko, computer system director, and Grzegorz Korytowski, deputy electronics director, by Z. Gluza: "Understanding the Market"; date and place not specified]

[Text] [Question] It is no overstatement to say that Ameprod introduced microcomputers into Polish markets. Since it became officially possible to buy the ZX81 computer for zlotys, it is no longer a magnificent vision of the remote future but a fact of reality. Did you realize this opportunity from the beginning, or was it just another transaction?

[Answer] Gzegorz Korytowski: We started from a market analysis. We had foreign currency from the export of other products and wanted to initiate production in the electronics field where we would be pioneers in domestic markets and which would bring success. Thus, microcomputers. Although, obviously, at the depth of the crisis, with deficits at every step, we could have gone into something else, such as ball point pens with watches ...

[Question] When did this happen?

[Answer] G.K.: At the International Fair in Poznan in 1982. Then we developed an understanding of our export possibilities. We also had to support the production for domestic markets with foreign currency receipts--so that we would have enough zlotys to manufacture export products ... The choice of microcomputers resulted from my personal hobby, which you could describe as fanaticism. But when in December of 1982 we shipped the first copies of the ZX81 I was not sure of success. What happened could hardly have been foreseen. No advertisement, no marketing was needed. In a few months, orders exceeded production capacity, and the social value of our activity became obvious.

[Question] Let us return to the very beginning. Since when has Ameprod been in existence?

[Answer] G.K.: Since April 1981. We began by setting up a metal factory that produced garden furniture, sleds, tables and at the same time an electronics enterprise to manufacture electric doorbells, television games... everything--simple articles. We started exporting in 1982--initially, metal and wood products (we also started a wood manufacturing department). These lines of export continue, but the main source of zlotys for us became microcomputers.

[Question] One can ask why is it that Ameprod, which is a commercial enterprise rather than a public organization, invests in such activities as, for instance, competitions of the Abakus Club which bring no profit? The contest-winning programmers receive Ameprod computers as a prize, although even the programs do not become the property of the firm...

[Answer] G.K.: This is not pure charity. Obviously, there is an element of risk. But, in fact, such public activities can bring to light talented programmers and yield good software. This can also bring profit.

Wojciech Lipko: One cannot work in the field of informatics without a more profound understanding of the meaning of this field. Our current experiences already help us understand most of the "microinformatic" transformations, the significance of this new field. Thanks to microcomputers, informatics can be placed right at the source of the problem and resolve them locally. Expensive equipment has been converted into handy tools which will greatly change our lives. It is a form of polytechnologization of society, which is quite necessary in view of the current advances. We must have long-term view.

The ZX81 is today the most popular computer in Poland in view of the number of configurations. There are as many as 600. The users of these computers --whether bought directly from us or brought from abroad--are potential buyers of our software, which we are beginning to sell. This is the computer of the first stage, from which one can pass on to more important professional applications, to larger systems. It can be a basis for school and college education, especially as an introductory element.

Manufacturing a microcomputer of this size and of such parameters today is impossible in Poland without large foreign currency outlays. Basic industries with their self-financing cannot achieve that. We have relatively greater capabilities, and so in a way this makes this our duty.

G.K.: As at other foreign enterprises, we are concerned predominantly with business considerations. But, in addition, we are microcomputer fans. This is a matter that brings satisfaction.

W.L.: Plans of many enterprises, including ours, are a function of the technological cultures of their authors. They are a collective product.

[Question] What are these plans?

[Answer] W.L.: In addition to microcomputers, we want to go into software. By the end of 1983, a club of ZX81 users was formed under our sponsorship. There are more than 100 members, both institutions and private computer owners. The first meeting was attended by more than 250 individuals. Thus, being aware of the software developed by the users, we will purchase the most interesting programs, test them, complete the descriptions and make them available to other users. We have also started the publication of a user bulletin with technical and marketing information. The second issue is being prepared for print.

[Question] All that for a payment?

[Answer] W.L.: Certainly. We are not subsidized and have to support ourselves. We have to sell to the government as many dollars as it requires. We have to pay taxes...

[Question] Let us return to your plans.

[Answer] G.K.: The orders for production of the ZX81 in 1984 have been closed, and we do not expect to continue this production in 1985. Most probably, the component base in the West will no longer be accessible, because the Sinclair Company has discontinued this model. We will be working on developing the configuration, adding new elements (such as the Seikosha printer for professional users or expansion of the memory to 64 K).

W.L.: The contracts that we have concluded will be fulfilled. The development of the configuration and software, however, will be based on our own work. We will not leave our clients to their own devices. They will not be abandoned, which we would like to underscore.

G.K.: At the International Fair in Poznan, this year, we will show a new microcomputer with better parameters, more universal than the ZX81, partially based on domestic components. At this point, we prefer to not give the details. But we are still working for amateurs, for beginners, without competing with professional systems. We would like to bring the users into contact with the computer at the lowest possible cost through the use of television and cassette recorders. This makes us different from other firms with which we are sometimes compared--Impol, Computex or Elwro. We also want to produce efficient equipment, but the cheapest possible!

[Question] Let's talk about prices. One often hears complaints that Ameprod charges too much for the ZX81...

[Answer] W.L.: We do not just import and warehouse but actually manufacture computers from components purchased in the West. The cost of manufacturing in Poland is high, and this is reflected in the price of the product. In addition, as mentioned, the number of dollars that have to be sold to the government (50 percent of gross sales) and taxes contribute their share. Another cost is maintenance of the service group. After all, we do not refer our users to England.

The ZX81 must also earn some money for development. After all, we get no credits...

G.K.: We give the users a guarantee. This is costly, because, after all, the equipment is not totally free of failures, especially since it operates in more strenuous conditions of amateur usership (especially the printer) compared to what is required by its design. On the other hand, private individuals are often willing to buy from us rather than--which is much cheaper--bringing our computers from the West.

[Question] Do you sell the ZX81 to private individuals often?

[Answer] G.K.: Rather rarely, although they account for half of our orders. We have to follow a strategy. For many reasons, it pays for us to sell computers to institutions. We are engaged in a kind of activity which is not properly appreciated by authorities. We are often confronted with difficulties as regards licenses for import and for export... What computers? Who needs them? And then we can show letters, either from Warsaw Technical Academy or a ministry or a university or a research institute. That is what from the government's point of view are letters of important clients, and then it is easier to overcome the hurdles.

W.L.: Indeed, the ZX81 is most frequently used in Poland by professionals in various institutions. But, in fact, for these users Sinclair's emphasis on low cost and simplicity is not suitable. This principle becomes a shortcoming in cases of intense exploitation. The mounting and dismantling of various configurations breaks the contacts, which are not made strong enough. We have to take this specific Polish form of functioning of the ZX81 into account.

[Question] They say that recent taxation policies could paralyze the activity of foreign Polonia companies...

[Answer] W.L.: The tax decisions passed in August of 1983 struck at our market. Ameprod's operations are still profitable, but we are incapable of developing production in volume. The high share of the hard currency (50 percent of the revenues rather than profits!) that we have to give over to the state can bring many enterprises out of business. Unfortunately, we still have to buy too many components for dollars. If they account for, say, 60 percent of the total and 50 percent we give to the treasury, then we have to find an additional 10 percent...

[Question] And yet you are optimistic?

[Answer] G.K.: We already have considerable experience for a certain time in business, and this helps. In 1983, our exports accounted for 8 percent of the total among the 500 existing Polonia companies in Poland. We hope that moving cautiously we will survive hard times. Yet the new regulations greatly limit production. This is obvious.

W.L.: Ultimately, they decrease the quantity of hard currency that goes into the government coffers. Domestic markets, however, suffer the most.

## Information Science in Danger

Warsaw INFORMATYKA in Polish No 5, May 84 pp 24-25

[Interview with Tadeusz Mazurkiewicz, chairman of the Council of the ZETO Enterprise Association and director of ZETO, Gdansk, by KW: "Dangers to Informatics"; date and place not specified]

[Text] INFORMATYKA asked Tadeusz Mazurkiewicz, the chairman of the Council of the ZETO Enterprise Association and director of one of the oldest and most dynamic enterprises of the association--ZETO, Gdansk--to share his views, which the editors believe to reflect the opinion of all those concerned with the future of computer applications in Poland.

[Question] The current situation of computerization in Poland has given rise to widespread pessimism. Less and less we hear comforting views and the overwhelming majority of speakers paint the future with dark colors. As a leader of one of the largest and best organized components of the informatics community, how do you evaluate this situation?

[Answer] Our economic crisis causes phenomena which constitute a deep regress in informatics, which appears as gradual decline of applications of computer technology. This retrograde movement has resulted in the following:

- a slower pace and reduced efficiency of scientific research;
- lower level of design, development and technological efficiency in industry;
- lower efficiency of organization and management; and
- reduced capability for innovation.

As a result, our economy--on an international scale--is pushed to the role of just a supplier of raw materials, food products and labor, because other Polish products simply are not competitive.

[Question] What do you think are the main reasons for this regression of our informatics?

[Answer] There are three basic threats to computerization:

- Loss of skilled personnel, which used to consist of most gifted and active individuals, even on an international scale. This is illustrated by the fact that between 1980 and 1982 information science has lost 10,385 individuals, that is, 18 percent compared to employment in 1980. This efflux is expected to grow up to 25 percent in 1983.
- The decline of research and development in informatics despite certain successes during the period of the crisis. (For instance, the development at ZETO Gdansk of an efficiency simulator and emulator for direct use of Odra programs on Ryad computers.)
- Depreciation of the technological base and lack of possibility for recuperation and modernization: In 1987, about 40 percent of computers will be 15

years old, and more than 50 percent of microcomputers 10 years old, which practically rules out further effective operation. In absolute figures, this means about 300 computers and about 800 minicomputers in a situation where the industry produces annually about a dozen mainframe computers and some 50 minicomputers.

[Question] What are the causes of these dangerous factors?

[Answer] I believe that the main sources of dangers are:

- The low average wage in informatics centers compared to the average wage in the economy. From 1979 to 1982, the average wage in informatics increased by only 88.5 percent, compared to the average for the economy of 118 percent. This tendency did not stop in 1983, when the wage differential exceeded 30 percent. I believe that the low wages in informatics result from the fact that computer centers are treated by the existing economic mechanisms the same way as manufacturing enterprises that make products for liquid market. In addition, many manufacturing enterprises have been awarded additional preferential incentives due to their affiliation with certain ministries or branches of the economy (relief in payments to the PFAZ or income tax). Importantly, the enterprises of information services in 1980-81 witnessed a very small reduction of output, and the prices for services were raised just minimally. In the meantime, in industry or construction, there was a major decline of output, while the prices grew several times over. The mechanism of economic reform in 1981-83 gave preference to those sectors which experienced a major decline of output and were capable of raising it quickly.
- Incomplete and inconsistent implementation of economic reform (frequent changes of the rules of economic game), which result in a lack of interest on the part of enterprises in maintaining optimal decisions and ultimately also can cut demand for information services.
- Low efficiency of research and development in applications of computer and information facilities and inefficient dissemination of these.
- Inadequate (in quantity and nomenclature) supplies of equipment manufactured domestically. Most of these products are still channeled into exports, which is more profitable than selling the equipment to domestic consumers. The valuable tools that could serve to improve the efficiency of our economy and contribute to the badly needed technological, economic and organizational progress are thus given away to other nations. This means that we are helping other countries to achieve progress, while at the same time depriving ourselves of its basic tools.
- The absence of coordination in development of information services and computerization. As a result, despite the low level of saturation of our economy with computer technology, there is an extremely poor capacity for utilizing the available computer facilities (on average less than eight hours per day, mainly with one-program operation). At the same time, there is a strong tendency to buy new computers abroad (in dollar-denominated sphere) or to organize a "network" of computer centers. Without appropriate organizational groundwork, which is not undertaken, these efforts will lead to results that were experienced, for instance, at ZUS in Warsaw, which, however, does not seem to deter others from similar endeavors.

[Question] What are the likely consequences of these dangerous developments?

[Answer] The main consequences of these damaging factors causing regression in our information services are these:

- gradual decline of the quality of information systems being produced;
- no progress in design and operation of information systems; and
- low reliability, and, finally, productivity, and therefore the performance of computer equipment.

This situation results in a widespread abandonment of computer applications by users, and thus initiates a process of gradual dismantling of a substantial number of existing computer centers.

[Question] In this dramatic situation, are there any possible remedial actions?

[Answer] I believe that this regression of information services can be stopped by rapid, efficient and adequate remedial actions. The following steps are most important at the moment.

First of all, we should stop treating information science and services as an industry of market products and consider it a basic stimulant of progress and modernization of social and economic life. Once this decision is made, the following actions should be undertaken:

- assigning government contracts to industry for manufacturing computer equipment for domestic needs according to the profiles defined by the users;
- leaving the entire depreciation funds with the enterprises of information services, so as to create conditions for self-support of their development;
- granting to information service enterprises tax relief and a possibility for channeling the saved funds into their own development;
- allowing the information service enterprises to stop paying contributions to the PFAZ fund (for instance, until achieving the average wage level in the industry).

Secondly, until the barriers preventing the natural development of computer applications are brought down, coordination centers with broad responsibilities should be established to supervise this development. (In particular, as regards budget allocations, definition of government contracts, etc.) First of all, as soon as possible, the mechanisms should be put into action that will ensure:

- developing the production of computer hardware in directions meeting the needs of domestic users;
- stimulating the development of information systems for priority areas, applications and fields;
- controlling the efficient utilization of hardware in short supply; and
- recommending which items should be imported as regards computer hardware and operation materials.

[Question] How could you briefly characterize the prospects of information science and computerization development in the context of our economic reform?

[Answer] No reform of the economy can be accomplished by hands or heads alone. Computers are the indispensable tool for that.

#### Revival of Information Science

Warsaw INFORMATYKA in Polish No 5, May 84 pp 25-26

[Article by Adam B. Empacher: "A Symptom of Reactivation"]

[Text] The meeting of Lodz information specialists with representatives of the government responsible for information science and computerization that had been planned since the fall has finally been held in mid-January of 1984. The meeting slightly resembled a session of a war council in a beleaguered town. Several principles were formulated aimed at pulling information science out of the abyss, and a special group of authors was set up to draw the corresponding document, headed by Professor Kackie.

The meeting in Lodz had a much broader significance than what its local character might suggest. It discussed not only the plight of information experts and crisis in the field but also the irrational computerophobia seen in programs and plans for emergence from the economic crisis that have been promulgated thus far.

In the opening address, the secretary of the Lodz Committee of the PZPR, Konrad Janio, mentioned that in preparing for the conference the idea was not to "hush the voices criticizing information science and computerization," but rather to open a constructive debate that would take a broad look at economic effects of computers--this powerful tool of decision-making ...

Marian Polski, director of the ZETO, Lodz, who was the conference moderator, emphasized that, although the most important element is personnel, we should focus attention in the long term on the disconcerting deterioration of computer hardware infrastructure. Although natural selection benefits the fittest factories, when options are too limited the struggle for survival stops progress. Only well-functioning computer centers can become reliable partners of the economy. However, the imaginary growth dynamics of many enterprises that hardly have attained the production level of 1979 are nowhere near achieving this reliability--not to mention the discriminatory attitude towards information centers, even those which in the meantime have registered a growth in services. As is well known, all it takes is to change the organizational affiliation to attain relief in depreciation allowances, reduced contributions to the PFAZ fund and tax relief--for those units which have the dubious luck of being affiliated with a noneconomic organization. The final effect, however, is the migration of a large numbers of well-educated information professionals into the private sector, into areas that have nothing to do with informatics.



Tomasz Pawlak, director of the Secretariat of the Informatics Committee, confirmed that the number of "statistical computers"--827 in late 1982--early 1983--no longer gives grounds for optimism, because a closer look shows that investment in information science has decreased from 1977 to 1982. In that period, these allocations dropped from 0.82 to 0.27 percent of the gross national product, but compared to total investment of the nation the change was even more drastic: from 0.31 to 0.06 percent. One official statistical document offers an optimistic outline of Poland's economic development up to the 21st century. This "optimism" assumes that by the year 2001 the national computer fleet will be almost half the number of 1981. It seems that the national economy is incapable of "greater information loading." One can note sarcastically that an economy "unloaded of computers" would be an outstanding phenomenon, even against the background of, so to speak, Fifth World nations.

Tadeusz Mazurkiewicz, the chairman of the Council of ZETO Enterprise Association, tried to evaluate the loss of most capable and active information and computer experts (in thousands of persons!). An interview authorized by him appears in this issue (editor's note).

Professor Andrzej Straszak commented on the activities of the hermetic Commission for Economic Reform; he participated in the work of the first committee of this commission. For understandable reasons, he did not disclose details but made no secret of the fact that information science and computerization do not enjoy much popularity among the members of this body, no more than among members of the government and party apparatus. The only exception seems to be the Lodz party authority. This is not surprising, because even in the mid-1970's a plenum of the Central Committee recognized informatics as an area that is not a priority development for our nation. The dynamics of information science were not determined in Poland by economic considerations: the crisis further deepened the downfall of informatics, which fell even below the level of the construction industry that is commonly viewed as the most backward area.

However, before two or three years the exponents of the economic reform will begin to feel that reform of payments calls for the development of supporting computerization--as soon as the modernization of accounting is brought into place. Proceeding to another widely debated subject, Professor Straszak noted that the shortfalls with the insurance system may eventually have positive results, because they made it evident that without computers and easily modified programs the system of large-scale reevaluation of pensions and benefits would be even less efficient. As an expert on automation, he assured the audience that computerization of energetics, which prevented gigantic losses that would have been caused by the disruptions of the national power supply system in a record cold winter, has more than paid for all previous "loading" of the national economy with computers and information specialists.

Finally, emphasis was given to the fact, not quite commonly known yet, that since 1983 the USSR has launched a giant program of computerization development, which has been given top priority similar to what was done with the space program in its time.

Among the subsequent speakers, an important place was occupied by local bankers and insurance representatives, who maintain that many government officials are unaware of the fact of how much data are currently processed by computers. Means should therefore be provided in educating the cadre of the government apparatus in adequately appreciating the importance of information, while information specialists should be taught to cooperate without confrontation.

The main session was concluded by a speech by Lidia Jackiewicz-Kazanecka, who is the Deputy of the Sejm and a member of the Sejm Commission for Science and Technology. The commission has issued a document (which in mid-December of 1983 was submitted to Vice Premier Messner) which stresses, among other things, the catastrophic widening of the gap seen in development of information services even between Poland and other CEMA nations. The document objects to the suggested restoration of the Informatics Committee, but supports the concept of creating a Government Committee for Scientific and Technological Progress with a broad competence. It mentions in particular the desirability of leaving the entire 100 percent of depreciation allowances to computer centers for their further development and proposes other various steps to upgrading the status of information services.

#### Computer Production, Operation

Warsaw RZECZPOSPOLITA in Polish 30 Jun 84 p 4

[Article by Tadeusz Podwysocki: "Meeting with the Future: A Million Information Units"]

[Text] Just a few weeks ago, the news quickly spread around the world that, according to a "leak" from major Japanese computer companies, they have developed a "chip" which can store up to a million bits of information. The keen competition in microprocessor technology immediately prompted the IBM to reveal that its laboratories have also developed a superchip, "1000 K," capable of storing one million information units.

One is reminded that within just three decades a room filled with vacuum valves, which constituted the first artificial intelligence device, has been replaced by a microchip the size of a corn flake. This is a measure of the progress unimaginable to a layman.

Most densely built integrated circuits, which comprise not only transistors but also resistors and diodes, are placed in a chip 5 x 5 mm in size, and the fibers connecting these elements are 30 times thinner than a human hair. The advance of microelectronics today is measured by the density of packing of semiconductor elements. The miniaturization has attained a degree where it became possible to "pave" one silicon plate with a million transistors!

When will the 1000 K superchip appear on the market? The answer is unknown. It remains to be determined which semiconductor is most cost-effective, which is not easy, and will take millions of dollars worth of research. The computers produced today use chips storing 64,000 information bits, which are known as 64 K

chips. However, for certain special purposes 256 K chips are already produced in some countries which carry up to 256,000 bits. These are likely to become widespread in the manufacture of computer systems.

A few months ago, IBM reported that it developed a process for producing 512 K chips which store more than half a million bits. Which of these chips will make it to the world market? The one that stores a million or just half a million information bits? The jury is still out on that. But either microprocessor is a gigantic step in the development of microelectronics and computers.

Chips of this kind can be produced at present solely in three countries: the USSR, Japan and the United States. No one else can do that. For that reason, it is pointless to speak about our limited capacities of microprocessor production. What we can do is to take advantage of cooperation in the CEMA framework and specifically develop our computer industry by relying on the component base from the Soviet Union. This has been the practice for many years.

We are faced with a queer paradox: in Poland the economy is saturated with information technology to just 50 percent of its level in Czechoslovakia or the GDR, but, on the other hand, the utilization of equipment hardly attains on average one half of the existing capacity. Actual operation time of a computer in Poland on average is less than 10 hours per day, and with a mini-computer less than 4.8 hours.

Henryk Pilko, the director of the Association of Producers of Information Facilities, rightfully notes that only 16.2 percent of computers in Poland have a memory larger than 512 kilobytes. (A byte is conventional information unit which equals one unit of storage capacity in the basic memory.) Thirty-four percent of computers have memories of 257 to 512 kilobytes. Only 7,000 have been equipped with television monitors. In other words, the capacity and needs in the development of existing configurations are huge. The degree to which these needs will be met depends on the funds made available to information enterprises and institutions.

The paradox also stems from the fact that while in Poland the applications and use of computer equipment are insufficient, on the other hand, thanks to the years of consistent cooperation with CEMA nations, it is Polish computer industry that has risen to an important position in exports. Computers are inferior in exports only to coal, rolled steel, sulfur and ships. This includes export not only of modern equipment but of Polish scientific and engineering thinking, embodied in the software design and technology. In 1983, 46.3 percent of computer equipment manufactured by Mera was sold abroad (in combination with automation facilities and measurement instruments). All CEMA nations and more than 50 Western countries are buying Polish computers and using them. What does this mean?

First of all, this is an indicator of steady technological progress in this area. Today, second-rate products would not sell. These are units that are consistently modernized with new and improved designs. Secondly, imports of

electronic assemblies and components manufactured in the West have been discontinued, and the computer systems are largely based on Soviet microprocessors and other assemblies and components.

This cooperation made it possible to produce at the Era Factory of Measurement Instruments and Computers in Warsaw the minicomputer systems of the SM-EMC family. Since 1979, the Soviet processor has been used here (SM3). Soviet microelectronic supplies made it possible to design and put into production highly specialized computer systems for scientific research experiments. Many scientific laboratories in the USSR are using these computers.

The Polish computer industry today, with its research and development base, has at its disposal the most modern Soviet microelectronic equipment, including microchips used to manufacture hardware that has gained the recognition of foreign customers and has been whetting the appetites of Polish information experts.

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